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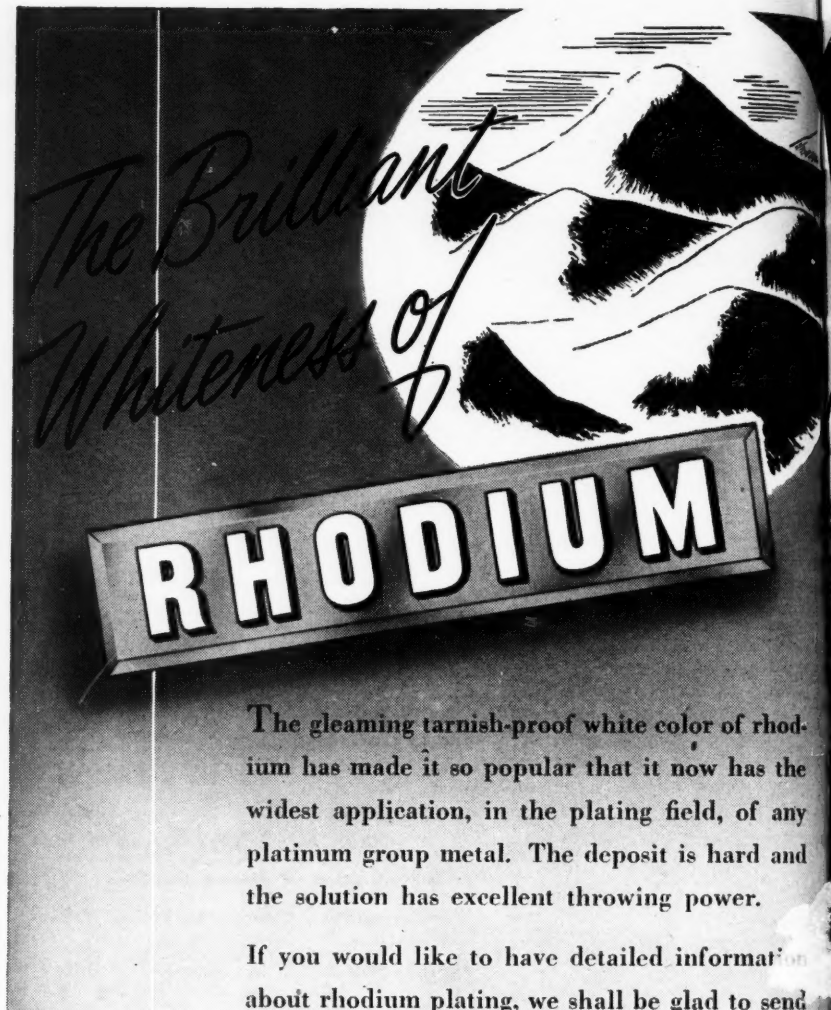

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pf editorial

Vol. 13, No. 12

SEPTEMBER, 1949

Plant Modernization Pays Off!

How one manufacturer installed new, modern equipment and mechanized the paint department in his plant is described in an article beginning on page 56 of this issue. Programs of this nature offer excellent returns on the investment made, and provide the only sound basis for continued progress in an increasingly competitive situation.

An efficient unit of this type can be completed only after careful and detailed consideration has been given to a number of aspects of the problem. The mechanical or production requirements have to be met, working condition requirements, both from the standpoint of employee comfort and production of a high-quality finish, must be satisfied, sources of heat and power for process operations must be considered, and safety devices of the proper type must be installed. This summarizes briefly some of the problems which face plant process engineering departments and suppliers of finishing equipment.

Then, the proper finish, reduced with the correct solvent, designed to utilize most efficiently a conveyorized dipping and baking installation (in this case) must be selected, so that product quality is maintained or improved in the new finishing system.

Engineers can design mechanical equipment to fit given conditions, but the user must give consideration to the fact that it is not always possible to predict how various finishes will work when applied by the equipment in question. Therefore, to secure all possible benefits from mechanized equipment, the user must be willing to do such experimental work as may be necessary, and should not hastily condemn the new developments which have been made.

This path is not strewn with roses, but those who follow it consistently will secure the definite competitive advantage of a high-quality finish produced at a lower unit cost.

E. A. Blount

Finishing THE LUSTRON HOME

PART III

Cabinet parts for the Lustron Home are finished in an efficient, compact spray painting and baking installation.

By EZRA A. BLOUNT

PF FEATURE

Parts for the various built-in cabinets in the Lustron Home are fabricated by stamping, forming, and spot welding. The parts are then transported to one section of the 100-foot wide by 1,400-foot long mezzanine in the main plant of the Lustron Corporation, Columbus, Ohio, where they are phosphatized, primed, finish coated, and baked in a well-engineered finishing installation designed to produce cabinet parts to keep pace with Lustron's program of 30,000 homes a year. An exterior view of the Lustron Home is shown in the article heading and a plan view is shown in Fig. 1.

Fabricated cabinet parts are delivered to the spray painting and baking installation and hung on an overh monorail chain conveyor which car them through the complete phosp tizing, drying, painting, and bak setup and on to the final assem area. A plan view of the Despat built spray finishing department shown in Fig. 2.

The first treatment to which s cabinet parts are subjected upon tering the spray finishing unit i cleaning and phosphatizing operati This operation is performed in a t stage, 136-foot long spray Bonderiz machine as the parts proceed thro at the rate of 10 feet per min Pumps in each section of the machi maintaining an 18-lb. spray press force the various processing soluti through sprays over the steel pa

after which the solutions are recirculated through the system. The solutions used in the machine, which has a 3-foot wide by 8-foot high tunnel opening, are as follows:

1. Alkali cleaner, Wyandotte No. 38, operated at 160 deg. F.
2. Hot water rinse, 145-165 deg. F.
3. Bonderite 1000, 155-165 deg. F.
4. Cold water rinse.
5. Parcolene rinse, 135-145 deg. F.

Parts leave the spray phosphatizing unit, as shown in Fig. 3, and enter a 45-foot long, hairpin type gas-fired dry-off oven operated at 350 deg. F. Here all moisture is removed from the parts. After cabinet parts emerge from the oven, they are cooled during the 5-minute travel time from the exit end of the dry-off oven to the entrance to the first prime spray booth. During this travel also, occasionally it is necessary to use tack rags to remove any possible dust particles or foreign material from the surface of the parts being processed so that a clean smooth surface is prepared for the subsequent coats of primer and finish paint.

As can be noted by reference to the floor plan, Fig. 2, there are four 24-foot long water wash spray booths in which primer and finish are sprayed on cabinet parts. The booths are arranged in sets of two, one set for spraying primer (one booth on each side of the conveyor), and one set for spraying finish coat.

Phosphatized, dry, clean panels, suspended from stationary, bar-type hangers, enter one of the two primer spray booths, as shown in Fig. 4, where spray finishers, working on two levels so that the 8-foot panels can be coated properly, apply Glidden Flash Primer No. 4116. The primer is supplied to the spray guns from 60-gallon pressure tanks and is sprayed at 15-18 p.s.i. fluid pressure and 60-lb. air pressure. The viscosity of the primer is maintained at 21 seconds, using a No. 4 Ford cup.

Primed panels travel in open air for a period of approximately 2 minutes so that the primer may "set" before the finish coat is applied. In the two finish coat spray booths, Glidden 4117 Finish Baking Enamel is applied at a fluid pressure of 20 p.s.i. and an air pressure of 60 p.s.i. The viscosity of the finish enamel is maintained at 23 seconds, using a No. 4 Ford cup. Figure 5 is a view of the second finish coat spray booth, upon leaving which the panels enter an oven for finish baking.

Fig. 1 — Plan view of the Lustron Home illustrated in the article heading

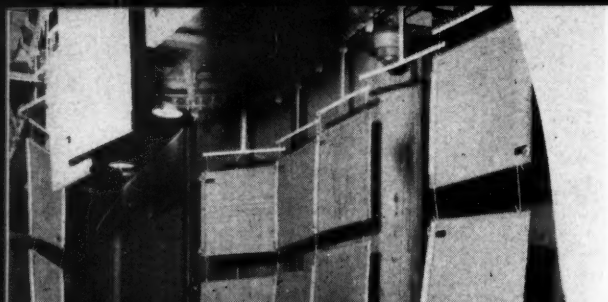

Fig. 3—Parts leave the spray phosphatizing tunnel and are dried in a U-type dry-off oven, after which they travel approximately 50 feet to the entrance of the first spray booth. The parts shown in this illustration have been dried and are en route to the prime spray booth.

of .03 oz./gal. (3 lb. for each finish enamel booth system; 3 lb. for each primer booth system) and the systems are cleaned and recharged each week. Daily laboratory analyses enable the plant supervisor to maintain the correct concentration in each spray booth at all times.

Water Wash Spray Booth Maintenance

No spray booth wall coating material is used in this Lustron painting unit due to the fact that a solid water curtain forms the rear wall of each booth, but a water conditioning material for the water wash spray booths, DuBois Differentiated Klarifiant, is used. The material is added at the rate

The primer and finish coat spray booths are cleaned periodically in accordance with the following instructions:

1. The two primer booths shall be chemically cleaned with DuBois Strypp every 8 weeks when operating 8 hours daily; once every 4 weeks

Fig. 2—Plan view (not to scale) showing the relative size and arrangement of the processing units which make up the cabinet phosphatizing, painting, and baking installation

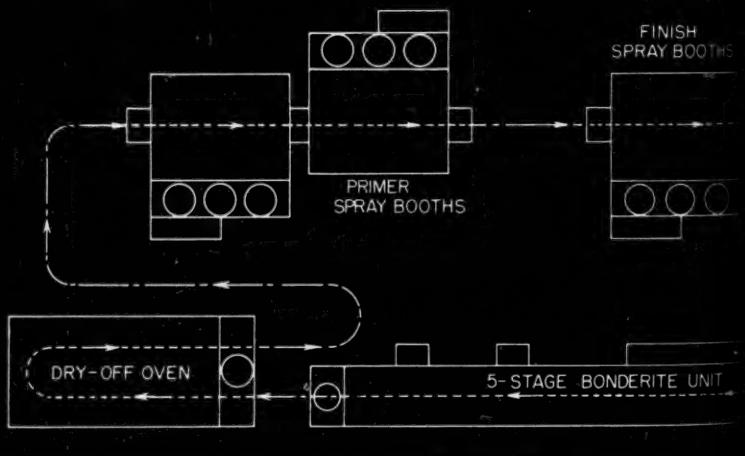

Fig. 4—Spray operators coat cabinet panels as they pass through one of the Despatch-built water wash spray booths. As can be seen in the illustration, two operators working on different levels are required to properly process the various size panels.

when operating 16 to 24 hours daily.

The two finish booths shall be chemically cleaned with Strypp every 2 weeks when operating 8 hours daily; and weekly operating 16 to 24 hours daily.

2. To clean a booth, shut off the pump and remove paint residues from surface of water from front and rear tanks. Use a perforated shovel or similar implement. Open the outlet valve to sewer.

3. Brush and scrape paint residue from the inside surfaces of the water tank and remove from tank.

4. Close the drain outlet valve and fill the tank with sufficient water to cover the pump intake to operating level.

5. Sift Strypp into water, using ¾ oz./gal.

6. Operate the pump until satisfactory cleanliness is achieved.

7. Open the drain outlet valve and drain solution to sewer. The system is now ready for charging.

Action and Function of Water Wash Spray Booth Compound

Functionally, a "water wash compound" is a substance added to the

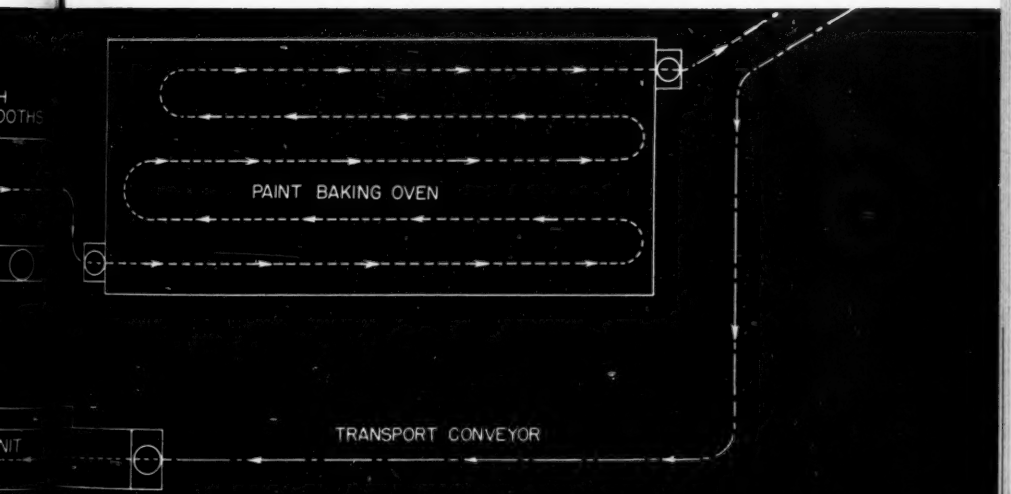

Fig. 5 — View of the final finish coat spray booth, showing spray finisher applying final touches to cabinet parts

water in the reservoir of a wet spray booth to render the water-entrained overspray non-interferent with the booth operation. The compound may accomplish its purpose by buoying the accumulated overspray into a floating surface matte, such that it can be skimmed off periodically and disposed of, either to the dump or to the reclaimer, as the case may be. It may do it by submerging the overspray into a fairly well compacted subnatant mass, removable at certain cleanout periods. It may do it by dispersing the overspray more or less uniformly through

the washing water in such a manner that it will not clog nozzles or dam up overflow weirs, and can be drained away with the water when the booth is emptied. Functionally, it must not introduce into the booth corrosion factors not otherwise present; preferably, it should positively correct any such tendencies. It must not present undue hazards or difficulties to the men using the spray booth. It must be able to cope with the bugaboo of foam

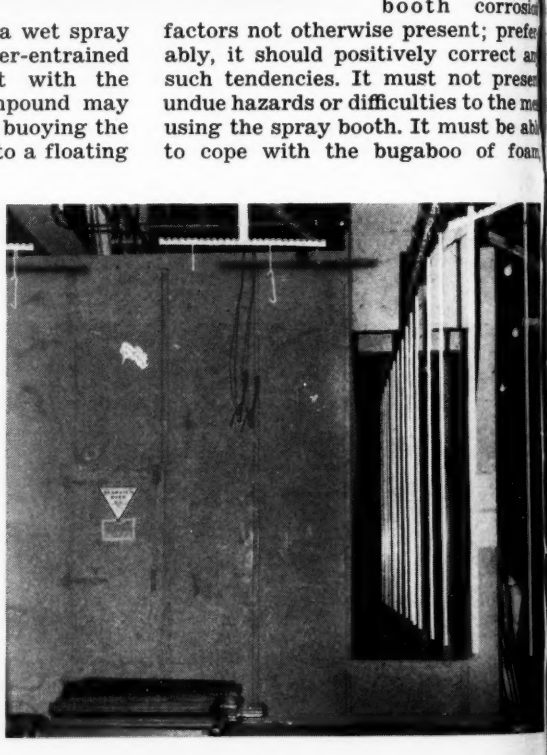

Fig. 6 — Cabinet parts after finish baking for one-half hour at 300 deg. F. leave the gas-fired baking oven and pass by an inspection station on their way to the final assembly area.

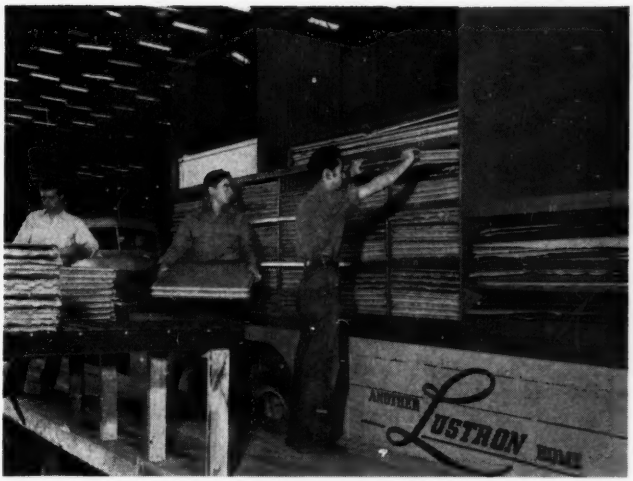

Fig. 8 — In the specially designed Lustron trailer each wall section and home unit has its own specific location. Here, packers are loading parts for a Lustron Home.

where such problems exist. It must not interfere with reclamation of paint, where such is the practice. It must be subject to reasonably close control.

In action, the water wash compound overcomes the natural adhesiveness of the paint (its stickiness, in other words), and renders it primarily cohesive (so that it sticks to itself instead of to other things). A given compound may float a paint, or sink it, or "digest" it, depending on the paint in question, and on how the water wash compound is used, as regards initial and sustained concentration.

The exact action of the water wash compound, according to theoretical physical chemistry, is still a subject for discussion. It is possible that the problem can be explained in terms of the Hofmeister Series, in connection with colloids. According to this theoretical consideration, hydrophobic colloids are coagulated by small amounts of ions bearing the opposite charge to that on the sol (ions of the same sign exert some effect but only a slight one). The series holds for the salting out

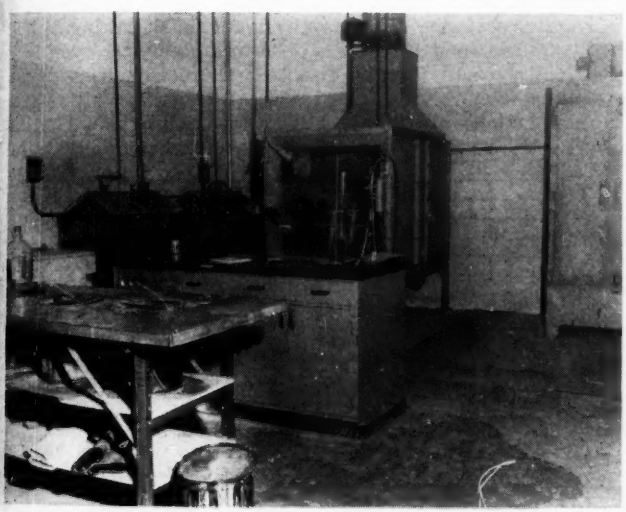

Fig. 7 — View of a portion of the well-equipped paint laboratory at the Lustron Corporation in which both routine control tests and new product investigations are performed

of hydrophilic colloids, the absorption of ions, and the effect of salts on the solubility of non-electrolytes. In the series, which can be referred to in any text on theoretical chemistry, the anions range from thiocyanate through many radicals to tartrate; the cations from lithium through aluminum.

It is quite possible that the pH of the water solution containing the water wash compound has a bearing on the action of the material. However, the nature of the compound, perhaps even the molecular weight of the anions in the material, also contributes to the results obtained.

Experience in the use of water wash compounds seems to show that concentration control is the greatest single aid to good performance, which might seem to indicate that concentration rather than pH is the predominant factor in the action of the chemicals. In all cases, it should be stressed that no water wash compound will perform satisfactorily unless the operational factors of the equipment involved are adequate. For example, if the ratio of entrained overspray to water in the system is too great, frequent stoppages and foaming are to be expected.

In order to coordinate the relationship between equipment and process, it is wise to initiate for each plant a plan covering charging, replenishing, controlling and clean-out of the spray installation. The technical service representative of the compound manufacturer can offer excellent advice concerning such a plan and assist in its initiation and operation. This service from the supplier should be provided continuously to make necessary adjustments in the program to compensate for changes in the plant and the process. For example, the paint-to-water ratio may change sharply as a result of a change in the objects being sprayed with consequently increased or decreased overspray. Further, a change of material being sprayed may bring about different conditions in the spray booth which may require a different concentration of water wash compound or even a new formulation. The supplier of the water wash compound will be able to aid plant operating personnel in correcting process difficulties that have developed and in making suggestions to eliminate future troubles.

Paint Baking

Painted panels for Lustron Home cabinets, after being sprayed with finish enamel as illustrated in Fig. 5, enter the 100-foot long by 22-foot wide Despatch oven for finish baking at 300 deg. F. for 30 minutes. The oven is a gas, direct-fired recirculating type provided with all necessary automatic safety and temperature controls. As may be seen by reference to Fig. 2, the

Fig. 9 — Illustration shows a view of a fully loaded Lustron trailer transporting a complete Lustron Home to a building site.

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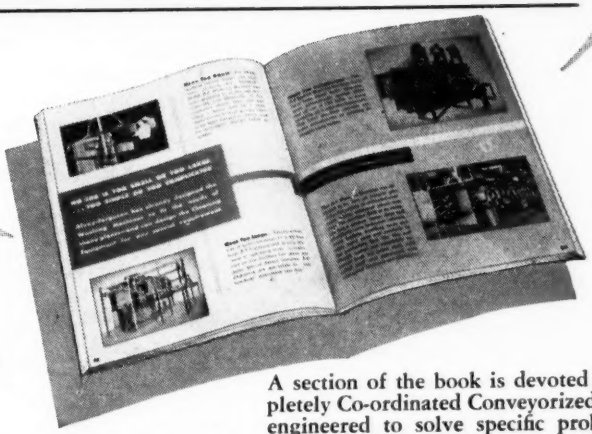

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conveyor is constructed with four return bends in the baking oven so that the proper baking time may be achieved and the desired conveyor speed and production in panels per hour maintained. Figure 6 shows some of the painted and baked panels emerging from the oven, after which each panel is individually inspected before it proceeds, still on the same overhead conveyor, to the assembly area where sub-assembly and packing operations are accomplished.

Paint Laboratory

As an aid to the control of this cabinet finishing operation, a well equipped paint laboratory serves to complement the work done in the main chemical laboratory to ensure that maximum operating efficiency and product quality are maintained. Sample panels are prepared in the finishing department regularly and sent directly to the paint laboratory for tests. The laboratory, a view of which is shown in Fig. 7, is equipped with a humidity cabinet, salt spray tester, a General Electric thickness gage, and other paint testing equipment, so that test panels may be tested thoroughly by various methods. In addition, the laboratory is equipped with a spray booth and a small oven so that sample panels may be sprayed or dipped, baked and tested right in the laboratory proper. These tests may be made for control purposes or may be used on new paint materials prior to their acceptance for production use.

Assembly

Components comprising the complete Lustron Home are assembled in the assembly bay, or area, and are packed into specially designed trailers which, when loaded, carry a complete Lustron Home to the building site. Figure 8 shows a trailer in process of being loaded with Lustron Home panels. The trailers are conveyed through the assembly and packing department by a floor conveyor and upon reaching one end of the assembly building contain one complete Lustron Home. Tractors then hitch to the loaded trailers and transport them from the Lustron plant to the building site where the various sections are quickly assembled to form a completed Lustron Home. Figure 9 shows a fully loaded, specially designed trailer leaving the Lustron plant for delivery to a potential home owner. The trailer performs three functions; it is a mobile collecting station in the plant, it carries parts for a complete house to the building site, and it is an on-the-site warehouse.

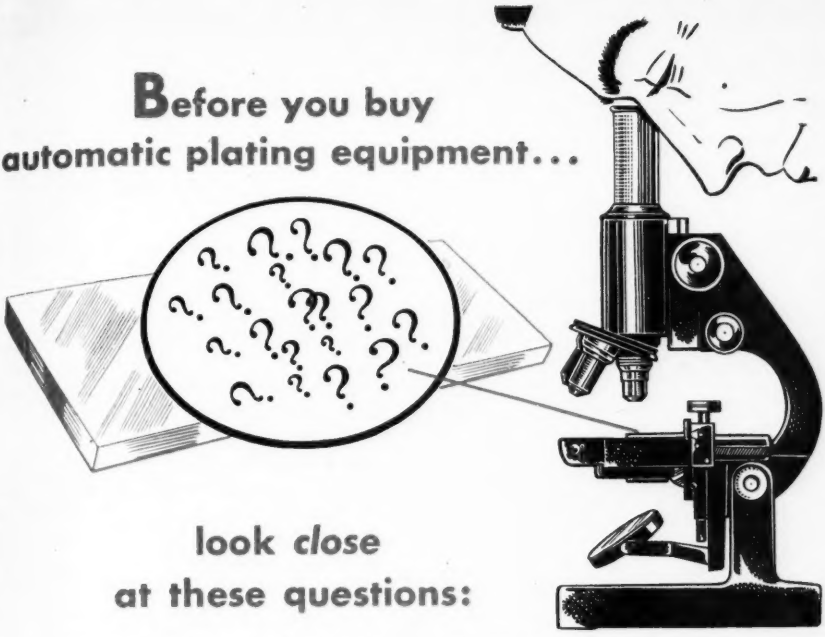
Not only are the methods of manufacture, finishing, and handling in the new Lustron plant examples of the best in modern manufacturing practice, but also the idea of designing trailers for the specific jobs of transporting the completed product from the factory to the point of use represents a step forward in a new direction in that the product manufacturer provides for and supervises the delivery of his product to the ultimate consumer.

Wheelco Bulletin PI-1 furnishes prices and cutout specifications of Wheelco Cabinet Type Instrument Panels, a simple efficient method for conveniently mounting instruments and auxiliary control equipment.

Copies of the bulletin may be obtained from Wheelco Instruments Company, 847 W. Harrison Street, Chicago 7, Illinois.

Bright Zinc Plating in Barrels. Technical instructions on the BBZ-200 Process for bright zinc plating in barrels are covered in a manual issued by the Hanson-Van Winkle-Munning Co., Matawan, N. J. Described in detail are the preparation of the solution, conversion of existing solutions, effects of constituents, solution operation and control, maintenance, effects of impurities, characteristics of the process.

Before you buy automatic plating equipment...



look close at these questions:

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Ask if the plating room will be tied up a long time during installation, cutting your work volume down and costing you money. Udylite machines may be shipped ready to run, and can usually be installed over the week-end.

Ask if it is good business to purchase a knocked-down model which must be re-assembled in your plant. Udylite machines, shipped already assembled, can be moved through most doorways, using only a few machinery movers instead of requiring many movers and often millwrights to assemble the sections.

Ask if you are going to run into transportation problems by ordering the machine. Udylite builds machines less than 11 ft. wide which may be shipped anywhere. (Railroads can route a car almost anywhere if less than 11 ft. wide; highway trucks in many states are also limited to 11 ft. Wider machines cannot be shipped assembled.)

Ask how much working space is required. Load and unload space is often a problem around a machine. With the Udylite machines space requirements are held to a minimum and the racks are within easy reach.

Ask if the maintenance cost factor has been considered. Udylite machines have astonished users with their low maintenance cost. The mechanism is simple and easy to get at; any shop mechanic can understand it and keep it in fine running order.

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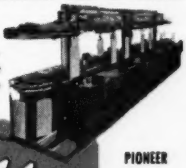
Shown here is the Udylite Fully Automatic Plating Machine which gives you the multiple benefits described on this page.



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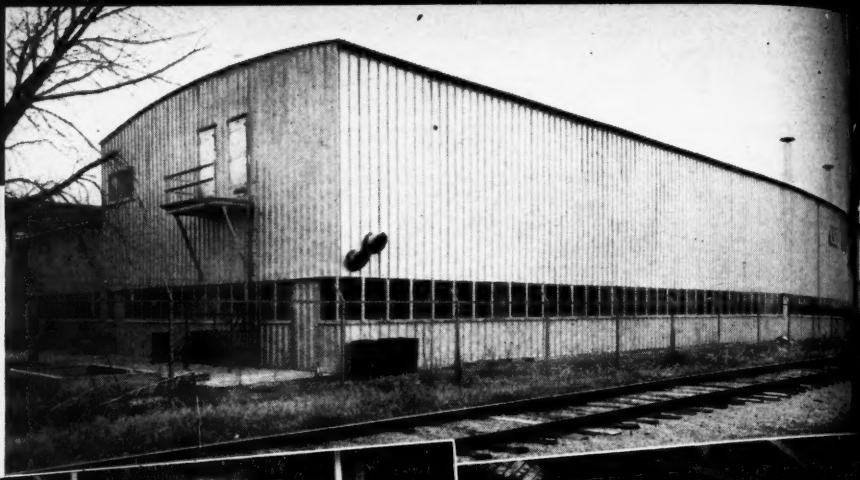

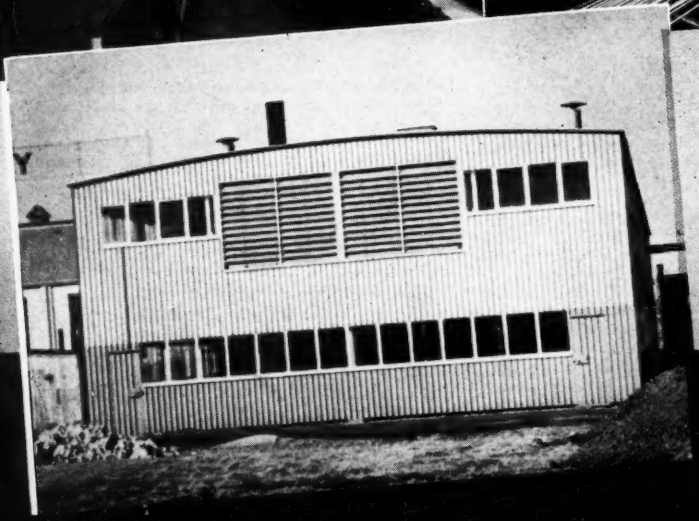

The two interior views are typical. The left view equipment on the grou where equipment for Cleaning and Rust Pr Spraying and Dip Enam operations is located. Th view shows equipment second floor level which mally includes: Filters Supply System, Drying Baking Ovens, Automatic perature Control Panels Safety Devices, Exhaust Recirculating Fans and

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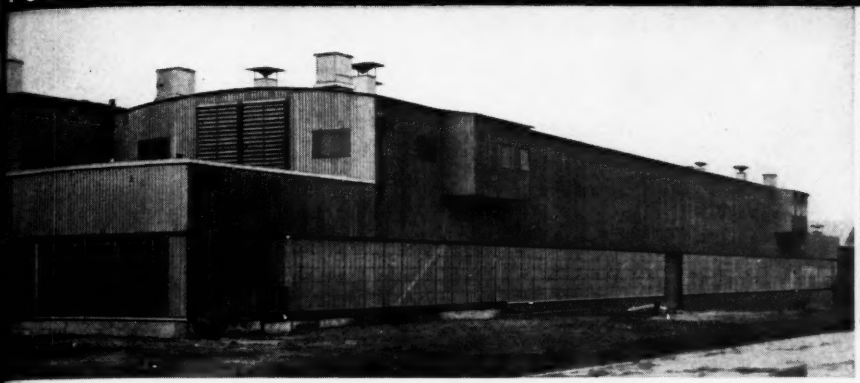

lf-Housed Finishing Systems Permit Freedom in Planning . Save Valuable Floor Space in Manufacturing Buildings!

these pages are shown three typical self-housed hon Finishing Systems installed outside adjacent nanufacturing buildings. Other similar installa- s have been made on the roof of manufactur- plants. The trend throughout industry today is ard this type of highly efficient, compact, self- sed finishing system—the reasons are obvious: It permits freedom in planning, which results better co-ordination, 100% operating efficiency, lower production cost per unit processed. It saves valuable floor space in manufacturing ldings. (3) Inasmuch as the housing becomes an gral part of the finishing system, the housing per cu. ft. is, comparatively speaking, surpris- ly low The outer shell is insulated steel walls and roof—permanent, all-weather construction used extensively in the construction of modern industrial plants. The entire contract is handled by the Mahon organization—one responsibility for final results. If you are contemplating new finishing equipment, it will pay you to investigate the many advantages of a modern Mahon Self-Housed Finishing System. Remember that the Mahon organization has pioneered development in this highly specialized field for twenty-nine years . . . constant research, experimentation and world-wide experience, in every industry where finishing constitutes a major production operation, has endowed Mahon engineers with a wealth of technical knowledge and practical know-how not available to you elsewhere.

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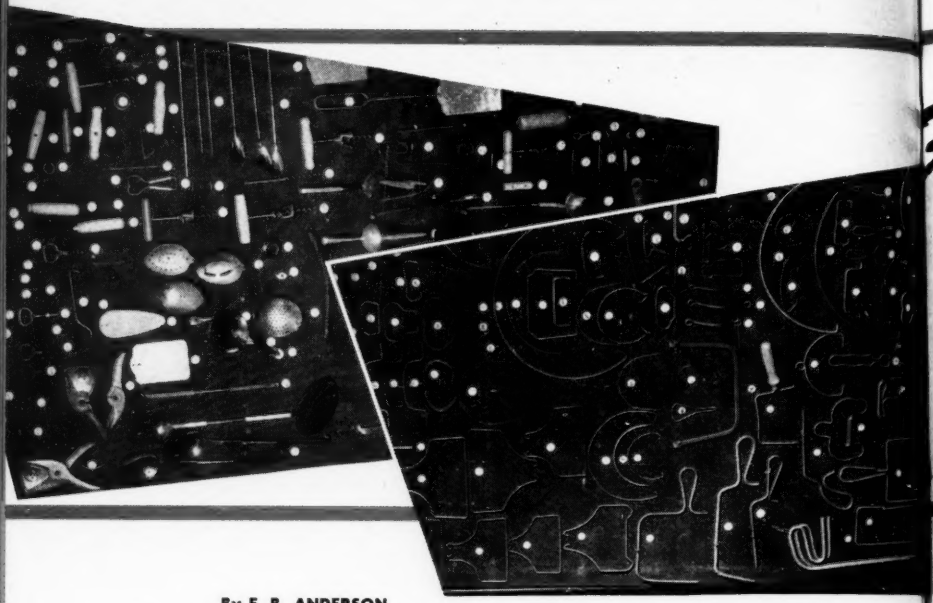


By E. B. ANDERSON
Vice President, Eastern Tool & Mfg. Co.

PARTS formed from wire, mostly in steel, are the primary product of the Eastern Tool & Mfg. Co., Belleville, N. J., one of the largest manufacturers specializing in this field. Supplementing this line and often combined with wire forms are small stampings produced either in conventional presses or in wire forming machines that include a press component. Out of some nine thousand different items, a considerable proportion requires no applied finish; but the remainder receives a finish, chiefly in the form of plating, in a department well organized and equipped for this purpose.

Although many types of wire are used, some of it being precoated, a large proportion is known as basic bright steel wire that is not precoated but has a smooth and fairly bright surface. Processing here described applies to this type of wire and to stampings. The latter are mostly mild steel, commonly cold rolled strip or coils, with smooth surfaces except at sheared edges. Such edges usually have fine burrs which as a rule, have to be partly or completely removed, depending in part upon the quality demanded by or special specifications of purchasers.

Naturally, the preparation of surfaces for plating has to be varied to suit both the type of part and the specifications to be met. Many wire forms are plated without any surface preparation other than cleaning, but a goodly proportion of wire forms and many stampings undergo one or more barrel tumbling operations to brighten surfaces or remove burrs, or both.

All tumbling is done in a separate room where 43 medium size (24-in.) and 20 smaller oblique barrels are provided, most of these being Baird twelve-sided unlined steel types. A few wooden oblique barrels are also used, especially for parts that have sharp points which must not be dulled or

Finishing of Wire Forms and Small Stampings

Surface preparation is commonly done in barrels but many parts require buffing, including some done on special machines. A large proportion of plating is in barrels of convenient design.

that are too fragile or might be detrimentally affected by tumbling in unlined steel barrels. Seven octagonal wood lined barrels are also provided for ball burnishing operations.

Much barrel tumbling is done dry or, to be precise, in sawdust that is only slightly moistened with kerosene. Many such barrels are shown in Fig. 1. An average charge includes about 60 lb. of wire forms, 15 lb. of hardwood sawdust and 1 pt. of kerosene. Barrels turn at about 30 r.p.m., and it commonly takes about 5 hr. per charge to secure desired results, although the time varies greatly with the condition of the parts and the degree of luster required.

Barrels are dumped onto screens that are shaken by hand to free the parts from sawdust, which is caught in a drum. In general, parts thus tumbled are ready for plating unless a higher luster is required, in which case ball burnishing may be necessary before plating.

Stampings and wire forms that have burrs or sharp edges which must be re-

Fig. 1 — One of the row of Baird oblique steel barrels in which dry tumbling is done in sawdust to which a small amount of kerosene is added

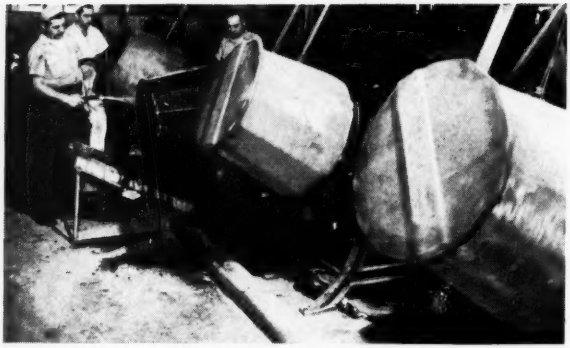


Fig. 2—Corner of the area in which wet tumbling is done. The chute helps to keep the aisle dry and clean as flush water runs back of the curb and thence to drains.

moved or cut down to some degree are tumbled "wet" or, more precisely, in the presence of sufficient kerosene to cause a paste-like coating or abrasive to adhere to the surfaces of the parts. For such work, an average charge consists of about 100 lb. of work, 10 lb. of grade B powdered silica and 2 gal. of kerosene.

In this tumbling, the average time is 10 to 15 hours with the barrel turning at 30 r.p.m., but again the time varies with the condition of the work and with the degree of smoothness required. Edges and burrs cut most rapidly but other surfaces are also scoured and smoothed to some degree. If burrs are heavy or considerable edge rounding is necessary, even 2 or 3 days of this tumbling may be needed. Barrels are kept covered and the inclination of the barrel is varied to suit the type of work.

When this cutting down is completed, 1 to 2 gallons of kerosene are added to remove most of the coating in another 10 to 20 minutes of tumbling. Then the kerosene abrasive mix is drained off. About 2 gallons of Clepo metal cleaner in a solution of 3 to 4 oz./gal. is then added and the barrel is run another 45 minutes. Then the charge is hosed off and dumped.

Fig. 2 shows several barrels used for wet tumbling. All such barrels are in a space having a low curbing and drains designed (with the addition of an inclined chute shown in Fig. 2) to keep water and solutions off aisle floors. From the chute the parts are transferred to tote boxes or barrels. Many parts then undergo 5 to 6 hours of dry tumbling, such as was previously described, to brighten surfaces. As a rule the parts then go to plating, if it is specified but, if a still brighter luster is required, ball burnishing is performed.

Burnishing barrels, Fig. 3, are lo-

Fig. 3—Row of barrels used for ball burnishing of parts that require more luster than is attained in other tumbling operations

Fig. 4—This Packermatic machine, equipped with a rotating table and three buffing wheels, is employed for semi-automatic buffing of the exterior of ladle bowls drawn from stainless steel and brass.

cated along one wall of the room. These steel barrels are wood lined, measure 30 in. in diameter by 16 in. wide and turn at 24 r.p.m. Burnishing frequently follows the wet tumbling just described but is also done on parts that have been dry tumbled in sawdust for 15 minutes to remove oil or grease.

An average charge for burnishing barrels is 100 lb. of parts, 400 lb. of steel balls or steel shot and 3 oz. of burnishing paste (soap) mixed in 2 to 3 gallons of water. The average burnishing time is about 45 minutes but may be more or less, depending upon the condition of the work and the luster required. After burnishing, the load is dumped into screening trays to separate balls from the work (either wire forms or small stamping) and is hosed off.

Parts are generally transferred to metal baskets and given a one-minute dip in an alkaline metal cleaner. Some then receive a quick dip in a 25 per cent solution of muriatic acid and are then well rinsed. Parts may then be dried, if no plating is required, or may be transferred to plating setups.

A few of the many thousands of different wire forms produced appear in the article heading, but not all of these require tumbling or applied finishes. Some wire forms are not adapted either to tumbling or to barrel plating. In the article heading are shown a variety of parts produced in this plant. Some involve only wire forms and some only stamped items but others are a combination of the two. Still others have wooden handles applied, of course, after metal parts are processed.

Naturally, the finishing operations have to be adapted to the type of product as well as to the character of finish specified. When tumbling is needed and the part is adapted to this processing, it is usually preferred because parts are handled in bulk and the cost per piece is low. In many cases, however, tumbling is not adaptable or does not yield required results.

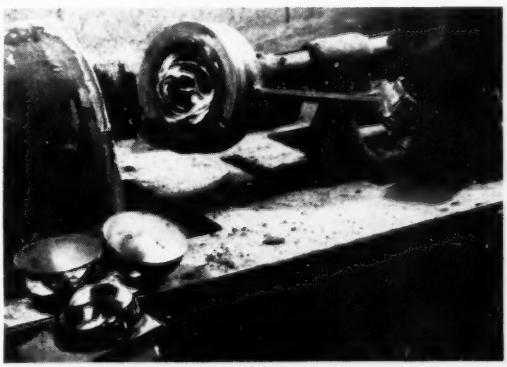


Fig. 5—Close-up of a special chuck and other parts of a machine used for buffing the interior of hemispherical brass ladle bowls. The chuck is not rotated but is given an oscillating motion about the supporting ball.

Often it is necessary to do wheel polishing or buffing, even though this involves hand work and individual handling operations.

Most wheel polishing and buffing

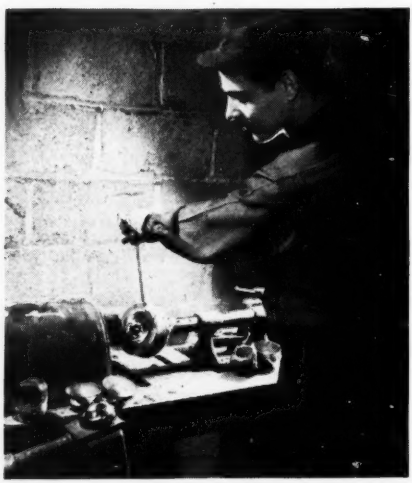


Fig. 6—Another view of the special machine for buffing the interior of ladle bowls set in a chuck which is rocked after being advanced axially into contact with the small buffing wheel

methods are conventional in this plant, but certain items lend themselves to semi-automatic polishing on the Parkermatic machine illustrated in Fig. 4. This machine has three buffing heads set to polish work applied to 24 carriers which rotate about their own vertical axes as they are carried past the wheels by the table which makes one revolution in 1¼ minutes. This machine is employed chiefly for buffing the exterior of brass and stainless steel hemispherical bowls for ladles, some of which are shown assembled in the article heading.

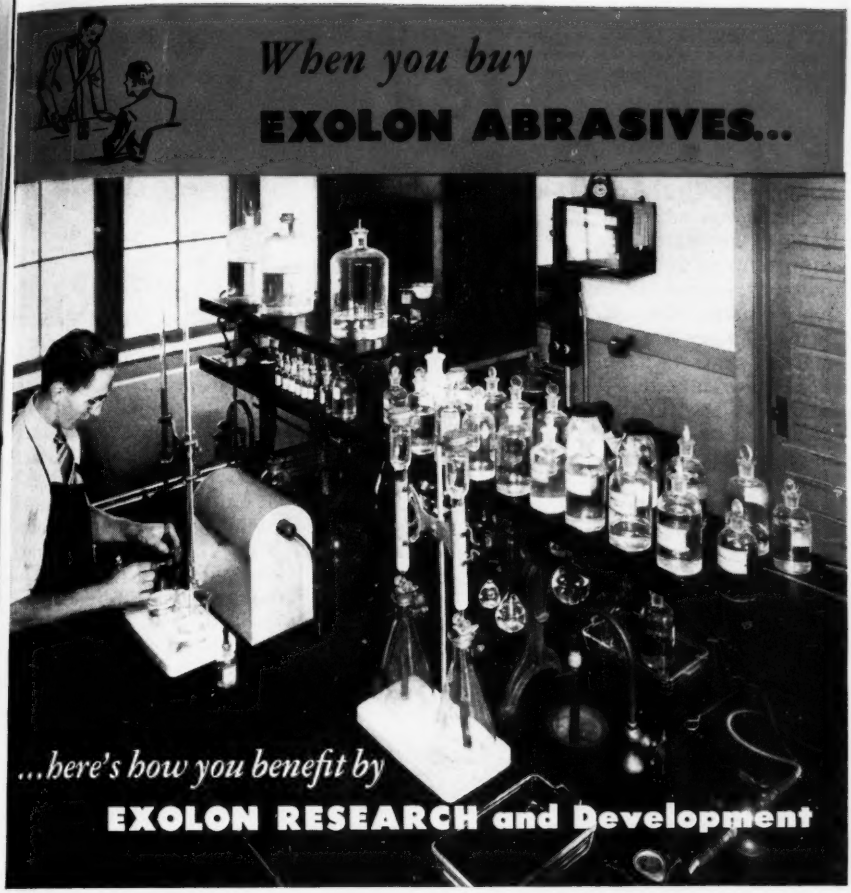
Spindles stop for loading and unloading at the front of the table where the operator sits before a transparent plastic screen. The whole machine is inclosed and there are large exhaust pipes adjacent to each of the muslin buffs. These are 14 in. in diameter by 9 in. wide and are of the Jackson ventilated type. They turn about horizontal axes and are set to insure buffing of all surfaces of the inverted bowls which make a fairly tight fit on the carriers. Matchless or tripoli compound is fed automatically to the buffs by a reciprocating holder at each wheel. If the operator keeps all carriers full, about 20 bowls a minute are buffed.

Interiors of stainless steel bowls are commonly left with the natural frosted finish but brass bowls are buffed internally on a machine, shown in Fig. 5, developed for the purpose in this plant. The 85 ply muslin buff used is equal to or slightly larger than the outer diameter of the bowl to be buffed and turns at 3500 r.p.m. Around the driving head is an exhaust cover into which air is drawn axially around the buff. Matchless No. 621 stick compound is applied by hand.

To support the work, it is set inside a bronze ring having a tapered bore that grips the large outer diameter of the bowl. The ring is supported in a chuck or holder arranged to swivel on a ball supported on a kind of tailstock spindle. The tailstock itself is loosely pivoted to the cast bed of the machine. Projecting from the holder is a lever with a ball handle which the operator holds in his left hand, Fig. 6, and rocks in such a way that the whole interior of the bowl is brought into contact with working surfaces of the soft buff.

The chuck does not rotate but is oscillated by the lever. To advance the work against the buff, the tailstock spindle is moved axially by a link and second lever pivoted to the base. This lever has a handle which the operator holds in his right hand.

With this simple machine, an operator buffs the interior of about 100 brass bowls an hour. When the buff wears too small, it is removed and replaced by another but is used again



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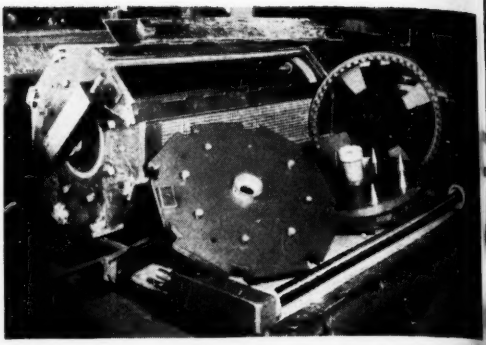

Fig. 8—One of the Eastern plating barrels and a group of components to be used in constructing a similar barrel. Dovetail construction without metal fastening, except for current carrying parts and drive gear, is noteworthy.

subsequently for buffing smaller bowls which are produced in several sizes. Thus buffs, starting at 3 to 4 in. diameter, are used for progressively smaller sizes of bowls until no longer useful for the smallest size. As soon as the buffing of each bowl is completed, the operator withdraws the tailstock spindle until the bowl strikes a rubber knockout inside the holder and is pushed out of the bronze ring.

Barrel plating is done in nickel, brass, copper and cadmium. The solutions used are all conventional as are also those used for still plating of parts not adapted to barrel plating or those that require a final coating of chromium. Such parts are wired or racked and the equipment used is that commonly employed when volume is not sufficient to warrant conveyorized plating machines. All solutions employed yield a bright plate.

By far the largest volume of plating is done in barrels. All of these barrels are made in the plant as is also the equipment for shifting the barrels into and out of the plating tanks and parts of the equipment for rotating the barrels. Tanks and some driving components are purchased. A total of 24 plating barrels is in almost constant use. Many of these are in double units such as that shown in Fig. 7. Barrels of this size are rotated at 11 r.p.m.

This type of barrel is elevated by a capstan wheel equipped with a ratchet which holds the barrel at any desired level. The barrel is lifted by cables that are wound on drums on an overhead shaft driven by chain and sprockets from the capstan. Before elevating the barrel, the operator slides the driving motor outward to disengage the pin-

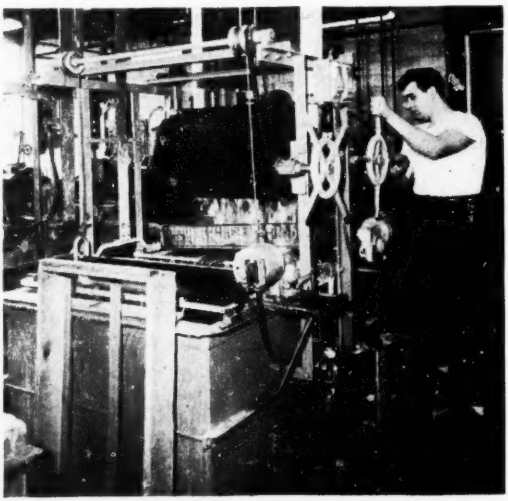

Fig. 7—One of several two-barrel plating machines built and operated by Eastern Tool & Mfg. Co. A capstan wheel is used to elevate each barrel when it is ready to be discharged into a tray, as here shown.

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ion from meshing with the pin gear on the end of the barrel.

When the barrel is locked at the desired height, a wooden tray with wire mesh bottom is placed on a short board that rests on the sturdy bus bars. Then the door is opened and the barrel is turned by hand to discharge the load into the tray. Thereafter, the tray is transferred by hand to rinse tanks.

Barrels are built in the plant partly because of the special requirements to be met and partly because the materials and construction used afford unusually long life, estimated to be fully 25 years. Panels, all of which are removable, are expected to last about 10 to 15 years. Fig. 8 shows an assembled barrel and most of the components used in its construction, including the end plates that contain the conical brass electrodes. No danglers are used because they would catch in many types of wire forms that must be plated in the barrels.

Electrodes constitute almost the only exposed metal on the barrels. The remaining parts are nearly all made from canvas base, acid-resistant laminated Spaldite. Most parts are cut from heavy sheet, the longitudinals being slotted for panels and dovetailed into ends. Panels are made with holes of different sizes to suit the parts to be plated and are readily interchanged but are held securely. The door panel slides but has a notched edge. Notches match those in the mating slide and after the panel is slid a few inches it can be lifted out.

Each electrode is held by a socket head screw. This head is recessed into a tapped hole into which a Spaldite plug or button is screwed and sealed. The screws pass through a stainless steel plate clamped between ¾ in.

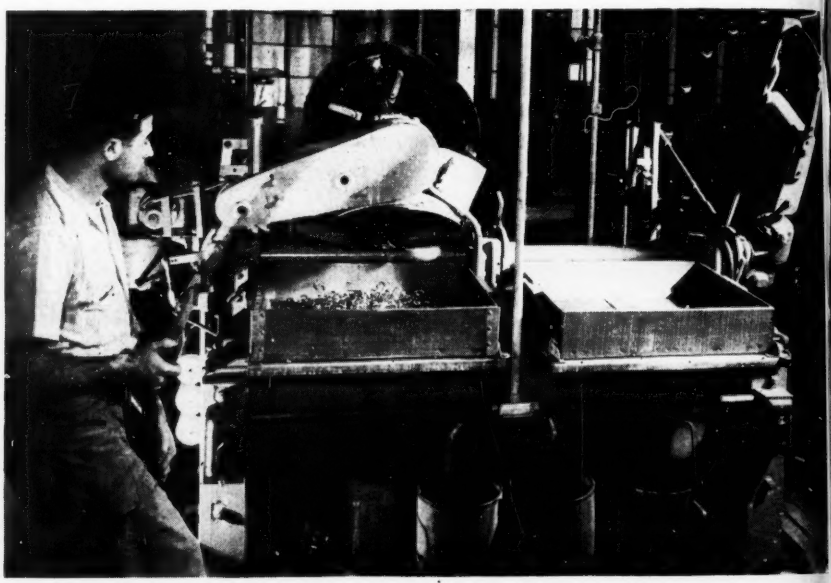
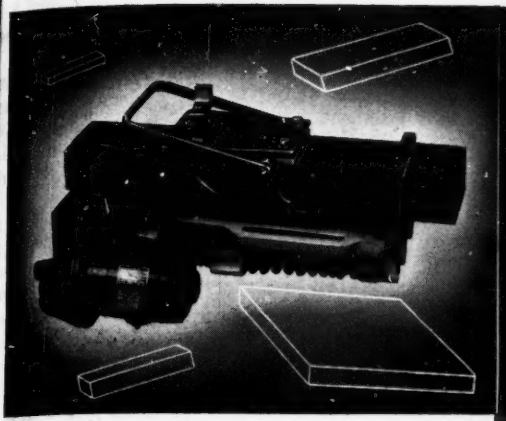


Fig. 9—Inclined type of Eastern barrel employed especially for plating small batches of parts. Convenience in discharging is among the advantages of this type of barrel of which two are included in this machine.



Stevens Precision-Molded Compounds are "Right" for the Job

HIGH operating speeds and pressures involved in automatic buffing require that the uniform density, quality and melting point of a composition be just "right", if buff wear is to be kept at a minimum while producing a high, uniform quality finish.

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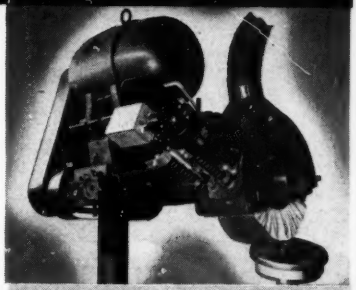
Stevens precision-molded compositions invariably deliver *a value far beyond purchase price* that pays off in extra performance on the job. You're entitled to that value. Get it in a Stevens precision-molded composition that is exactly "right" for *your* automatic buffing work.

Stevens has perfected a *Liquid Tripoli Compound*, which warrants your serious consideration. If interested, let us tell you more about it.



Stevens Precision-Molded Composition Offers These Advantages:

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- **LESS WASTE** because longer cakes reduce percentage of nubbins.
- **PERMITS LOWER INVENTORY** and more flexibility in composition use because strict adherence to exact dimensions allows two or more cakes to be clamped side by side and firmly held in applicator.
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Spaldite end plates. Fastened to one end of the barrel is a cast nickel-iron pin gear that meshes with a driving pinion of the same material. The shaft is stainless steel and passes through stuffing boxes of Spaldite and rubber. Bearings are also stainless steel. All parts of the barrel are made readily removable and are easily replaced.

Barrels of the size and type shown in Fig. 8 are used in largest numbers and commonly hold 75 to 100 lb. of work. Some are made in the same design in larger size. Considerable plating is also done in inclined barrels of a later design, one of which is shown elevated in Fig. 9. This type is adaptable for smaller loads than can be plated to advantage in barrels like that in Figs. 7 and 8, partly because the electrodes are in the lower end against which the load is constantly moving.

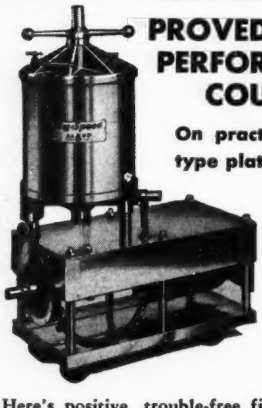
Inclined barrels are arranged to rock about a horizontal tube to the outer end of which is attached a counterweighted quadrant which the operator can swing readily by hand when the barrel is to be raised and lowered. When the barrel is elevated to the position shown at left in Fig. 9, the contents slide out into a tray and any electrolyte drains back into the tank. This makes the barrel easy to load and unload and electrolyte does not spill or splash on the floor.

All barrel plating is preceded by soaking baskets of parts for 5 min. in No. 1 Clepo cleaner (2 to 3 oz./gal.) solution heated to 180 deg. F. After rinsing, the baskets of parts are given a short dip in 20 per cent muriatic acid solution and then are rinsed in three water tanks before the parts are dumped into plating barrels. Average plating time is about 45 minutes but this sometimes is reduced to 30 minutes in copper plating.

The brightener used in a standard nickel barrel plating solution is cadmium chloride but a different proprietary nickel plating solution, with organic brightener and non-pitting agent, is used for still plating of parts that are later chromium plated. Chromium does not plate properly over nickel that is barrel plated as above indicated.

After barrel plating, parts are given a cold water rinse except when coated with copper or brass in which case a hot soap solution is used as it leaves a thin soap film that helps to retain brightness. Rinsing usually is followed by spin drying in hot air or by passing parts through a rotating tunnel dryer that is gas heated. In some cases, however, drying in sawdust is specified.

It will thus be seen that, although most of the finishing methods employed are fairly conventional, the equipment includes many features that contribute to the production of excellent results, including high economy.



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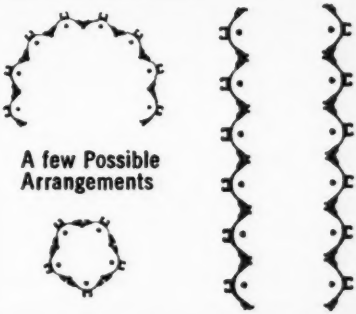

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ELECTRIC HEAT FOR MODERN INDUSTRY

Part I

By E. R. YARHAM,
Cromer, Norfolk, England

SURFACE finishing is normally the last stage in the production of a component. The method of finishing to be applied depends, therefore, upon (a) the nature of the materials used and the treatment they have received and (b) the purpose, appearance and service conditions of the completed article or structure.

Usually a surface is finished by a series of processes with intermediate stages of cleaning and pre-treatment. Methods of cleaning and degreasing are described below and likewise various finishing processes, divided into four main sections: mechanical, chemical, electroplating, and paint finishes.

References to the electrochemical process of anodizing are made. Anodizing is a process of thickening the oxide film naturally formed on aluminum. This film, which improves resistance to corrosion, may be used as a decorative effect, or it may be dyed or used as a key for paint.

Cleaning and Degreasing

The thorough cleaning and degreasing of a surface entails removing one or more of the following:

(a) Mineral oil blanking lubricants
(b) Pure oil or compound-type oil cooling fluids used in drilling, tapping or automatic screw machines
(c) Soap emulsions used in milling, blanking, or pressing
(d) Heavy soap-base drawing compounds used in presswork
(e) General dust and dirt

The method to be used may be one of hand cleaning or immersion or vapor cleaning, depending upon the nature of the work to be cleaned and upon the requirements of subsequent processes.

Hand cleaning by means of a swab with an organic solvent can be used for very large structures and for articles that cannot be treated by immersion. Small work of simple shape and in regular quantities, or batches of small components, can be treated with a solvent or an alkali solution. The solvent is applied in liquid, spray or vapor form, or by a combination of these; alkali cleaning is carried out in a bath

r by a spray.

Solvent vapor will remove mineral and pure oil lubricants and cutting fluids, (a) and (b) above; solvent spray, in conjunction with vapor, will remove soap emulsions and soap-base compounds, (c) and (d); and a combination of solvent liquor and vapor removes general dirt and dust, (e). Alkali solutions are effective in immersion systems, and in spray machines. Solvent and alkali processes applied in succession solve many problems of cleaning and degreasing.

In hand cleaning at least two operations are essential, one to remove the contamination, and the second (by means of a clean, solvent-soaked swab) to remove the greasy film left by the first. For heavily contaminated work, further treatment may be necessary. A non-toxic organic solvent should be used; a mixture of white spirit and light solvent naphtha in equal quantities by volume, heavy naphtha No. 1, and other aromatic solvents are all suitable.

Abrasives are useful for removing thick oxide films, deposits such as burnt-on oil or grease, and surface blemishes. Work that is corroded, however slightly, should be brushed briskly with a steel wire brush or with steel wool. For thin metal sheets, especially of clad material, a bristle brush should be used.

In immersion and vapor cleaning a non-inflammable solvent is used, either as vapor or liquor, and is generally trichlorethylene or some other chlorinated hydrocarbon.

In alkali processes, the work, which may have been already partly cleaned by organic solvents, is immersed for a few minutes at 176-203 deg. F. in a solution of:

Washing soda—0.8—2.4 oz./gal.
Trisodium phosphate—0.8 oz./gal.
or
Washing Soda—1.6—6.4 oz./gal.
Sodium silicate—½-1 lb. 0.8—1.6 oz./gal.

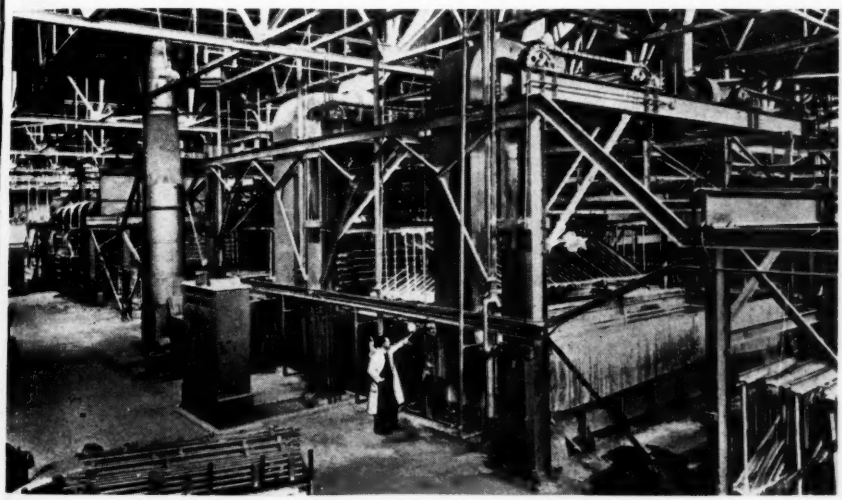

Fig. 1—A view of a large plant used for cleaning, pickling, and paint dipping parts used in the construction of aluminum houses.
(Photo courtesy Electro Chemical Engineering Co., Ltd., England)

The following mixture, used at 100 to 110 deg. F., is suitable for removing soap-base compounds:

Sodium carbonate—3.0 oz./gal.

Sodium bicarbonate—6.0 oz./gal.

After alkaline cleaning a black "smut" film is usually left on the surface of the metal. This consists of a film of insoluble alloying elements which normally can be rinsed off, but a dip in a solution of 30 to 50 per cent nitric acid and 10 per cent hydrofluoric acid may be necessary, particularly when the smut is due to deposited silicon. Fifteen to thirty seconds' immersion is usually sufficient for aluminium alloy die-castings and for wrought materials, but sand-castings require a period of one to two minutes.

A thick oxide coating or a faulty anodic film may be removed in a dip containing 10 per cent sulfuric acid and 4 per cent sodium fluoride. The period of immersion should be just sufficient to remove the film but not long enough to cause etching of t metal surface.

A final rinse in water should be us to remove acid or alkali left from pr vious treatments.

Polishing Processes

Grinding, scurfing and polishi processes are generally used in tu for producing a highly polished fini on rough castings and forgings.

The flash or fin is removed with soft or semi-soft wheel at a speed 6,000 to 10,000 ft./min, or by hand mechanical filing. A very small fla may be removed by emery bobbin Emery wheels are run at about 6,0 ft./min., and the grade of emery us varies from grade 60 to flour emer according to the state of the surfac On rough castings, grades such as 6 80, 120 down to flour emery are applie successively. Abrasive powder, fixe with glue, can be used in place of a emery wheel.

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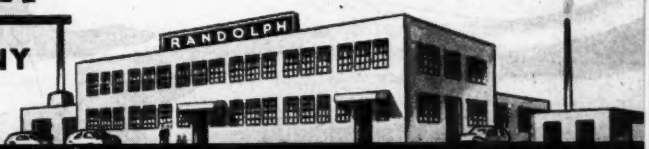

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TABLE I

Typical Examples of Polishing Materials and Sequences of Operations

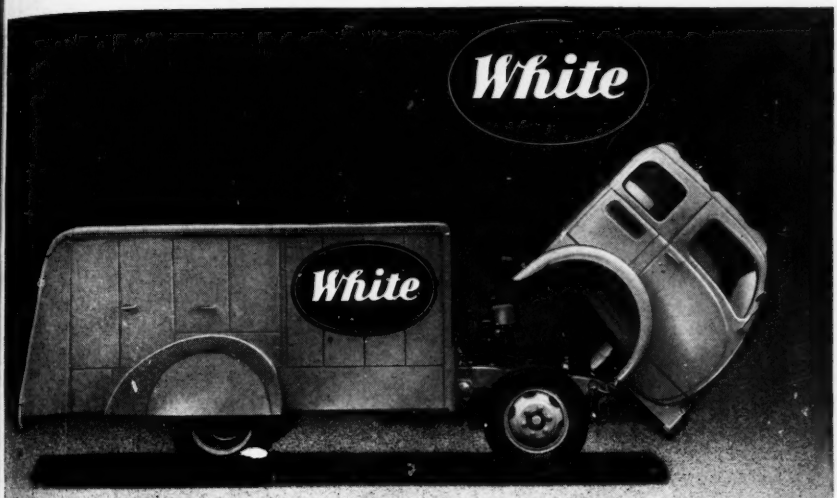
Material	*Sequence of Operations*	*Wheel*	*Abrasive*
Wrought products	Buffing	Sewed muslin buff	Tripoli
	Coloring	Open muslin buff	Vienna lime
Sand castings	Roughing	Glued rag or felt bob	No. 60 and No. 90 emery
	Greasing	Glued rag or felt bob	No 120 and No. 200 emery
	Buffing	Sewed muslin buff	Tripoli
	Coloring	Open muslin buff	Vienna lime
Die castings	Greasing	Felt bob	No. 120 emery
	Buffing	Sewed muslin buff	Tripoli
	Coloring	Open muslin buff	Vienna lime
Automatic screw machine products	Greasing	Felt bob	No. 180 or flour emery
	Buffing	Sewed muslin buff	Tripoli
	Coloring	Open muslin buff	Vienna lime

Fresh emery bobs are usually headed in with a hard brick and lubricated with a small amount of tallow. As felt emery bobs are not always sufficiently flexible, linen mops dressed with glue and emery are often used instead; the operation is then known as "scurfing".

The fine scratches left on a surface after treatment with emery cloth are removed by mopping at right angles to the scratches, using hard linen mops and Tripoli composition.

Local overheating of the work must be avoided, particularly if it is to be anodized or electroplated. Sometimes the grease-mopped surface is lightly etched, first in dilute caustic soda, then in nitric acid, in order to reduce the effect caused by such overheating. After etching, the surface is washed with hot water and finished off with a soft calico or swans-down mop, dressed either with tallow and Vienna lime or with one of the proprietary white finishing compositions for aluminum.

Rouge finishing compounds should not be used on aluminum as a rule because the rouge tends to work into the surface and may show as pink patches if the metal is later anodized.



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Custom Industrial Finishes

FOR ANY PRODUCT OR PRODUCTION PROBLEM

TABLE II

Procedure for Obtaining Coarse, Medium and Fine Finishes

Type of Finish	Mesh Number	Nozzle Size (in.)	Air Pressure (lb./sq. in.)	Distance of Nozzle from Work (in.)
Coarse	6-20	⅜ x 3	30-90	12-20
		½ x 3	50-90	12-20
Medium	40-80	¼ x 5	30-90	8-14
		⅜ x 3	30-90	8-14
		½ x 3	30-90	8-14
Fine	100-200	¼ x 5	30-75	8-14
		⅜ x 3	30-75	8-14

Sheet metal work does not usually need emery treatment, but work that has been badly scratched during fabrication, and spinnings manufactured on wooden chucks, may be polished with 120 or flour emery on felt or calico, according to the contour of the surface to be polished. Sharp corners on architectural work can be maintained if they are polished with felt bobs.

Automatic polishing machines are available for aluminum strip, tubing and simple sections, as well as fabricated products.

Blasting

Grease must be removed before a surface is sand-blasted. As in similar procedures for sand-blasting other metals, the type and size of the abrasive, the air pressure, angle and speed of impingement of abrasive, and distance of the nozzle from the work will all affect the result. In general, a fine sand at low pressure is suitable for aluminum, the low pressure applying particularly to decorative work. Continuous operation is essential for a uniform finish, especially for a matte appearance; therefore large sheets are sand-blasted in a machine that treats the entire width of the sheet as it is run through.

In shot blasting steel or chilled-iron shot is used, the shot being thrown against the surface by a combination of centrifugal and tangential forces, or by means of compressed air. The process not only produces an attractive finish but has a beneficial effect on the fatigue strength of the material.

Distinction should be made between the two types of shot in use—angular shot (sometimes described as steel grit) and rounded shot. The maximum improvement in fatigue strength is obtained by the use of the latter type and the process is then more accurately described as shot peening.

In operation it is very difficult to avoid some admixture of rust with steel shot, and after a period of use there will be a proportion of fine steel

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● **Flat-Top has Greater Area.** From 20 to 25% more effective area than the ordinary ball. More metal, less frequent loading.

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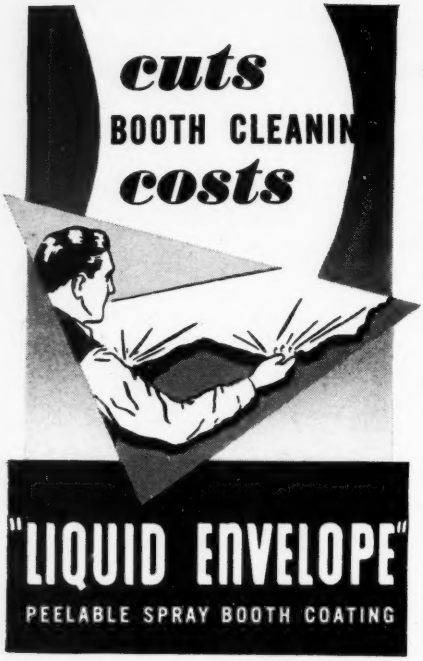

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particles present, due to the wearing away of the shot. These particles of rust or steel tend to become embedded in the surface of the aluminum during shot peening and this may cause surface discoloration and lowering of resistance to certain corrosive influences. When corrosion resistance is of first importance, this type of surface roughening should not be used.

Satin finishes are produced on aluminum by scratch brushing with stainless steel brushes, which may have either straight or crimped wires. The effect can be varied by altering the wheel speeds and the hardness and diameters of the wires. For example, a 6 in. wheel with a wire diameter of 0.015 to 0.020 in. running at 960 r.p.m. produces a coarse finish; a smaller wheel with a wire diameter of 0.002 to 0.005 in. running at 450 to 700 r.p.m. produces a much finer finish. Solvent or vapor degreasing, or bobbing with flour emery is a suitable pre-treatment for scratch-brushing.

Scratch brushing may be performed either wet or dry. A finely scratched surface is produced quickly and economically by pouring a small stream of water on the brush while the work is being treated. A little size is often added to the water. When the scratch brush is used dry it burnishes the surface and gives it the familiar white satin finish.

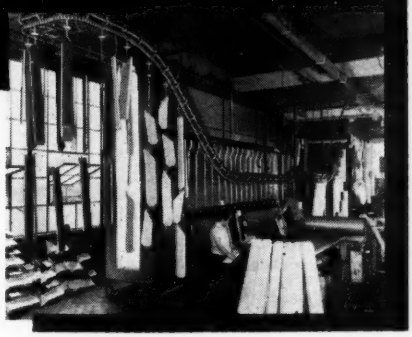
To obtain a uniform finish, the work should be held so that brushing is in one direction only, but non-uniform effects may be desired. For example, to produce a satinized pattern on large aluminum sheets, the method is to scratch-brush on a machine in one direction, apply a metal stencil, and scratch-brush through this at right angles to the original direction. A contrasting pattern is thus produced.

Scratch brushed surfaces are sensitive to finger-marking and should be lacquered or anodized for protection.

Uniform and attractive finishes can

Limited Floor Space?

SOLVE *Your* PAINT-BAKE PROBLEM *this easy way*



KOOL VENT Metal Awning Corporation of Michigan has been using Jensen infra-red successfully for many years to paint-bake aluminum awning parts.

Until recently the job was done in a flat, horizontal-type Jensen infra-red oven, with two paint lines, two spray booths, two conveyors. Then floor space became a problem.

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In Finishing Production . . . the Future Belongs To Men Who *Plan* For It!

be produced on aluminum surfaces (particularly on spinnings while they are rapidly rotating) by applying a suitable grade of emery or garnet paper. A series of fine or coarse lines is produced, and these may be applied all over the surface, or used as a contrast against a polished background. A similar finish can be produced on flat surfaces by applying appropriate grades of sand, emery or garnet on a flat-bed finishing or sanding machine. Surfaces finished in this manner must be lightly etched before they can be anodized in order to remove ingrained dirt which would darken the anodic film, but it is unnecessary to etch before electro-brightening.

Barrel Polishing

Small components such as pressings and die castings may be polished in a suitable tumbling barrel, provided their shape is such that they will rub together without interlocking. Barrels differ in size and shape; they may be open or closed and rotate in different planes. It is most important to select the type of barrel and method of operation appropriate to the specific job in hand. The articles are placed in the barrel with a suitable polishing compound and the barrel is revolved at 25 to 35 r.p.m. for about 1½ hours. The continual friction of the articles against one another will cause scouring, grinding, polishing or burnishing, according to the compound used. The brightness of the finish depends upon the duration of the process. As the process tends to round off sharp corners and projections, it should not be applied to screw threads or to parts which must be finished to exact dimensions.

A mixture of water and finely powdered pumice produces a satin finish but as pumice may become embedded in the surface this treatment is not suitable prior to anodizing.

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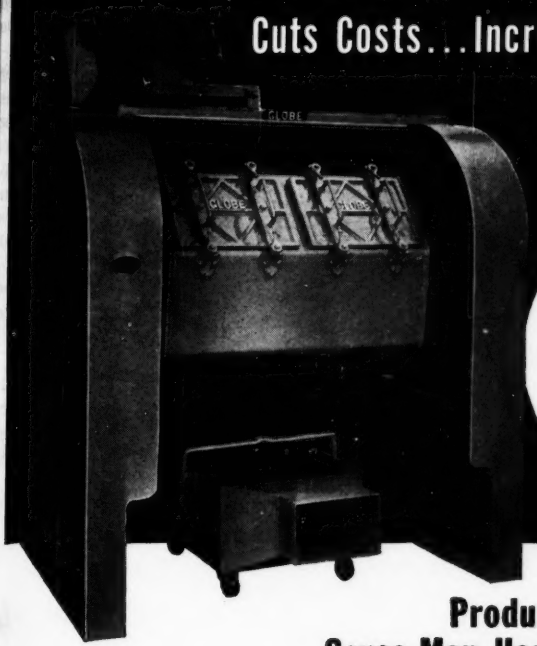

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Produces Finer Finishes! Saves Man-Hours of Hand Labor!

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Hupp's Experimental Engineering Laboratory will show you how to cut finishing costs. Send samples of parts to be processed along with finished part. There's no charge or obligation.

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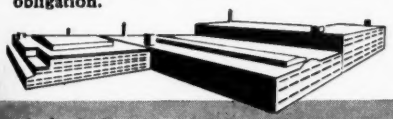

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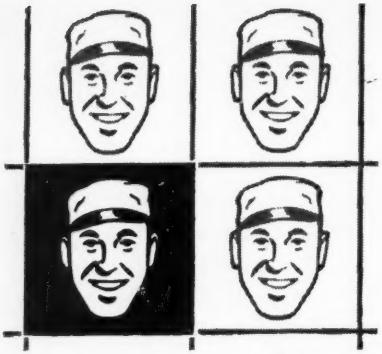

ALL GOOD WORKERS . . .
but one does MORE than the job assigned!

Like an ambitious, able workman, Parco Cleaners do more than they are required to do.

Parco Cleaners do more than remove grease and soil. The line of specialized metal cleaners formulated by Parker *condition the metal for the next step in finishing.*

When you use a Parco Cleaner, factors in addition to the type of soil determine the type of cleaner to be used. The experienced metal finishing expert from Parker Rust Proof Company will help you select the cleaner that will contribute most to the economical, efficient production of the finish on your product.

Whether your production calls for cleaning before a Parker Process, general cleaning, or cleaning before plating, use a Parco Cleaner!

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- **EMULSION CLEANERS**
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Detroit 11, Michigan

A smooth, bright finish may be obtained by first tumbling the articles in steel shot, then burnishing them in hardwood sawdust for about an hour and finally tumbling them in sawdust impregnated with a good grade of clear wax. The barrel should be open, mounted obliquely and revolved at 45 to 55 r.p.m. for 12 in. diameter barrels and 30 to 45 r.p.m. for 15 to 20 in. diameter barrels; the shot should be $\frac{1}{8}$ in. to 3/32 in. in diameter. This process is used only if no other treatment is to follow.

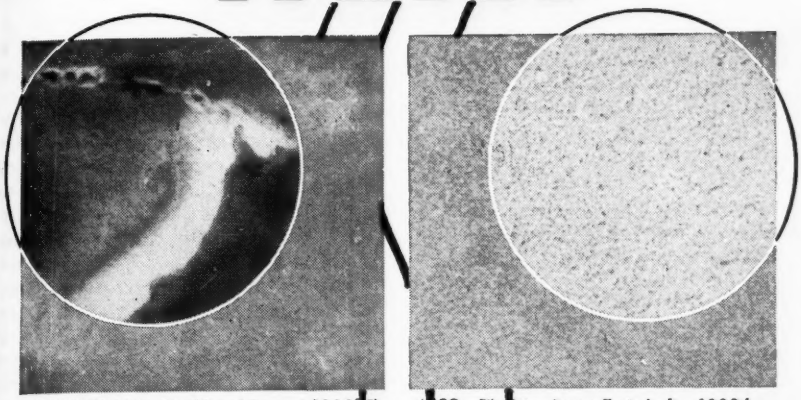
Tumbling in steel shot, with a soap-and-water solution as a lubricant, produces a fairly bright, semi-gloss finish. Two parts by volume of shot are used to one part by volume of work, with sufficient soap solution to cover the whole. The barrel should be lined with hardwood, and steel balls of 5/32 in. in diameter are satisfactory except for small work. The soap used should be very soluble, free rinsing and non tarnishing; concentrated solutions should not gel. The balls must be hard and smooth, and must be kept bright and free from rust.

Shot other than round is used for special purposes; star shapes, for example, are used to penetrate the re-entrant angles. If the shot becomes coated with aluminum, its reduced efficiency as a burnishing agent may be partly restored by changing the water, but washing the shot in a caustic soda solution will remove the aluminum completely without affecting the shot.

In one tumbling process devised for removing burrs and producing a smooth finish, the polishing agent consists of soft Neoprene rubber particles impregnated with aluminum oxide abrasive. The essential feature of the process is the cushioning effect of the rubber, and it is stated that good finishes can be obtained without removing more than 0.001 in. of the material polished. The abrasive is used dry and in a standard barrel or in a

MICO SILICONE-BASE FINISH SOLVES YOUR FINISHING PROBLEM WHEREVER THERE IS

HEAT



ORDINARY FILM—Total breakdown at 1000°F) MICO—Film integrity unaffected after 1000 hrs.

In this dramatic test by a nationally known laboratory the steel plate at the left was coated with ordinary heat-resisting material, while the one at the right was coated with MICO Aluminum. Both were then subjected to 1000° heat. As the unretouched enlarged sections show, the ordinary film completely broke down after only one hour. But MICO held up without signs of deterioration and was still going strong *after 1000 hours!* What further proof of MICO'S amazing durability! MICO can protect YOUR product, too, *wherever there is heat!* Investigate MICO today!

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special barrel with a lining of neoprene rubber.

Chemical Surface Treatments

In the "Normal Process" after preliminary degreasing, the parts to be treated are immersed for three to five minutes in an aqueous solution of sodium carbonate and sodium or potassium chromate at 194 to 212 deg. F. The shorter time is normally sufficient as a preparation for painting. A suitable solution consists of 7.5 per cent crystalline sodium carbonate with 1.5 per cent sodium or potassium chromate, and although the proportions are not critical the bath materials must be pure for successful treatment. One gallon of solution will treat about 16 sq. yd. of surface. The solution must be made up at regular intervals to compensate for drag-out losses, and extra sodium carbonate must be added periodically to make up for chemical deterioration of the solution. It will be observed that as the solution deteriorates, a longer period is required to obtain the correct film.

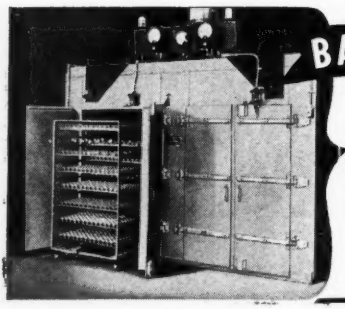
A matte or frosted finish is produced on aluminum and its alloys by immersion in a solution of from 5 to 10 per cent caustic soda at a temperature of 104 to 176 deg. F. As the action of caustic soda on aluminum is very rapid and may leave a dark gray or black film, the immersion period should be brief and followed immediately by a dip in cold 10 per cent nitric acid to neutralize all residual caustic soda. For aluminum-copper aloys 50 per cent nitric acid should be used. When silicon is present, 10 per cent hydrofluoric acid is added to the nitric acid solution. After the acid has been removed by a thorough swill in water, the article is dried on a steam table or in hot sawdust. For a superior finish, a final rinse in softened or distilled water is followed by rapid drying in clean steam.

For producing matte surfaces on stressed parts the R.A.E. Bath D is decommended as least affecting the fatigue properties of the metal. The solution consists of 10 per cent sulfuric acid and 1 per cent sodium fluoride by weight. The material is further dipped in cold 50 per cent nitric acid in order to remove deposits, and finally rinsed in hot water.

The texture of the etching produced by chemical processes depends upon the purity and quality of the material treated, and a special "etching quality" aluminum sheet is produced for diffusing reflectors. When the purity of the aluminum exceeds 99.8 per cent the matte effect becomes less apparent, and on 99.99 per cent purity metal caustic soda tends to produce uniform solution of the metal with no resulting matte effect.

Acknowledgment

The writer is indebted to The Aluminum Development Association (Great Britain) for special permission to use data from "Information Bulletin No. 13" in this article.



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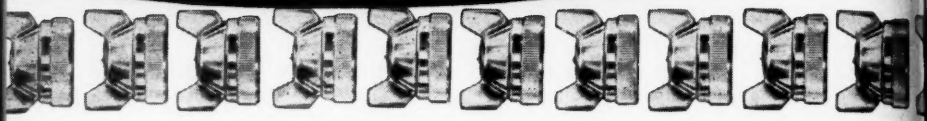
44 precision spray guns



To give you the ultimate in fine finishes every detail of the Model 18 is made to watchmaker's accuracy. No detail has been overlooked to make it the finest precision spray gun you can buy.

To make the Model 18 fully versatile, 44 different, interchangeable nozzle set-ups are available for it . . . each designed and manufactured with the same care as lavished on the gun itself.

Each of these 44 nozzle set-ups sprays a particular material or group of materials better than the others.

There are few materials, if any, that cannot be applied with the Model 18 and the right nozzle set-up. The list to the right is only indicative of the many materials that can be sprayed faster, more efficiently and economically.

There is no mystery to nozzle set-ups, even if many of them look very much alike. Each set-up varies from the others in only two ways:

1. In the size of orifice in the material nozzle.
2. In the sizes and arrangements of orifices in the air nozzle.

By varying these factors, nozzles are made to efficiently spray almost any material that is sprayable. To get the correct nozzle set-up for your particular use, just specify the material you intend to spray. We will do the rest.

If, in the future, you change materials or wish to use the gun for another job, all you have to do is buy a second nozzle set-up for that specific material. It will be interchangeable with the others.

"As pace-setters, we are pledged to find ways to make still better spray finishing equipment . . . and to make it first!"

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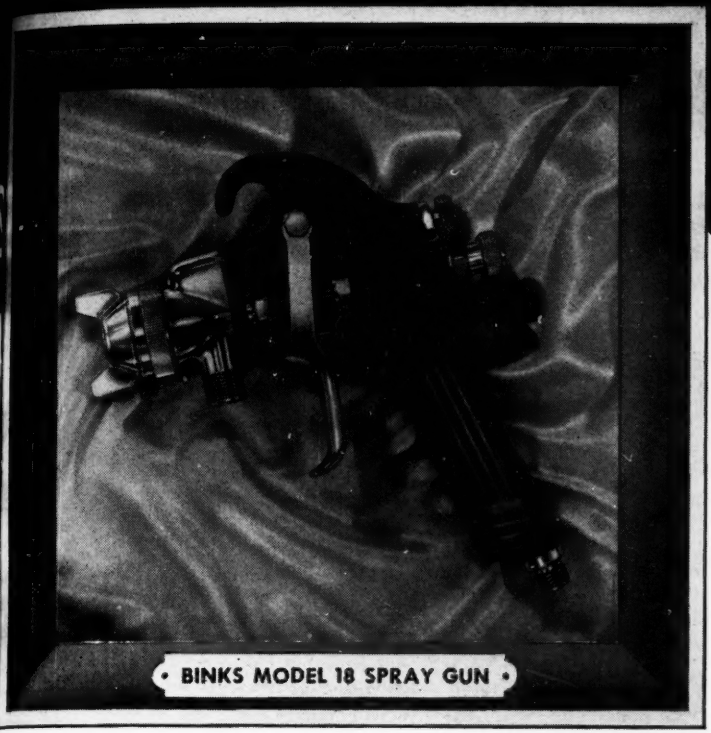
President



• BINKS MODEL 18 SPRAY GUN •

TYPES OF MATERIALS THAT CAN BE SPRAYED WITH A BINKS MODEL 18 SPRAY GUN

Airplane Dope

•

Aluminum, Bronze, Calcimines, Enamels, Hot Dope, Hot Lacquers, Lacquers, Synthetics, Undercoats, etc.

•

Asphaltum — Emulsified and Heavy Materials

•

Cement Paints

Asphaltum Paints, Plastic Paints

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Safety Switch Finishing

Mechanization of the paint department in The Wadsworth Electric Manufacturing Co., Covington, Ky., has resulted in rapid, automatic finishing of safety switch parts in a compact, efficient, fireproof unit.

By H. O. CUNNINGHAM

Process Engineer
The Wadsworth Electric Manufacturing Co.

ONE of the chief problems facing all manufacturers today, namely, that of securing an improved product finish at a lower unit cost, has been solved by Wadsworth through the installation of a conveyorized cleaning, paint dipping, and drying unit. Three processing units and the necessary chain conveyor are installed in a room containing 2500 square feet of floor space, and in addition, a low pressure boiler is built into one corner of the room, separated by a brick wall from painting operations.

Switch boxes and parts to be painted are brought into the paint department in shop trucks from which they are unloaded directly onto the 310-foot long overhead chain conveyor. The conveyor contains 94 specially designed carriers which handle parts weighing from a fraction of an ounce up to 150 pounds, and completes a processing cycle every 42 minutes. The production rate, depending upon part size, generally averages well over 1200 parts per hour.

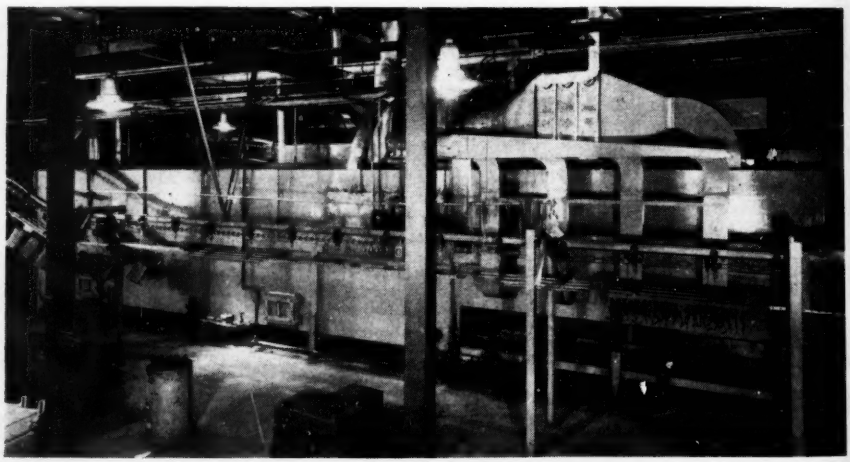

Fig. 1—An overall view of the Alvey-Ferguson washing, rinsing, and drying machine, showing switch cabinets being carried up the conveyor incline at the left and into the washer

Fig. 2—Clean, dry, switch boxes leave the washer, make a 180-degree turn on the conveyor, and enter the paint dip tank. Wall at right conceals steam boiler. Short length of steam lines increases operating efficiency of this setup.

The three units comprising the finishing installation are a two-stage washer and dryer, a paint dipping tank, and an infra-red drying oven, all served by a continuous overhead chain conveyor. Parts to be processed are carried through a 3 x 4-foot opening into the 32-foot washer. In the washing section, Wyandotte emulsion cleaner, held automatically at a temperature of 140 deg. F., is circulated from a 600-gallon tank and pressure sprayed on the parts. A spray water rinse, at a temperature of 160 deg. F., follows the cleaning operation, after which the parts are dried in an 8-foot section of the machine by hot air. The air is steam heated to a temperature of 180 deg. F. and recirculated. Fulton-Sylphon temperature controls maintain steam-heated processing solutions at the desired temperatures. The washer is completely insulated with a 1¾-inch thickness of Magnesite, canvas covered. Exhausts at the entrance hood, washing unit, and rinse unit keep steam and objectionable fumes from the room. Figure 1 is a view of the cleaning and drying unit.

Leaving the drying unit (see Fig. 2), the conveyor makes a 180-degree turn and carries parts into a 3-foot wide, 18-foot long, enclosed paint dipping tank. This tank holds 950 gallons of

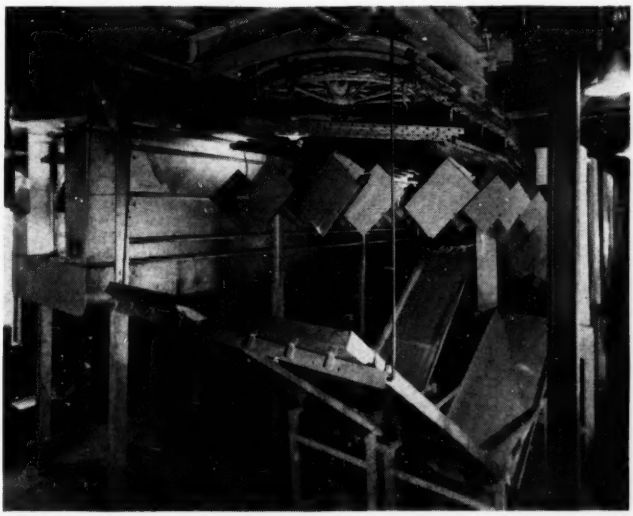

Fig 3—Painted parts leave the enclosed paint dip tank (also supplied by Alvey-Ferguson), pass over inclined drain boards, and double back to enter infra-red oven for final baking.

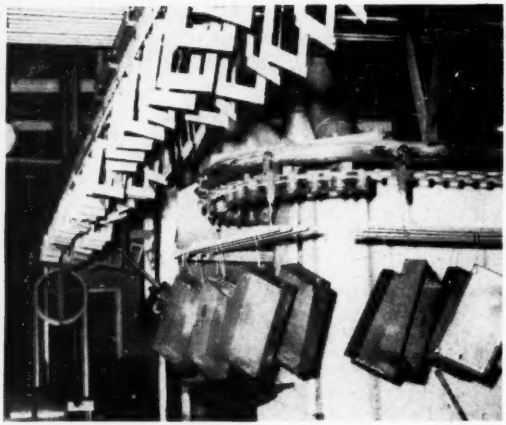

Fig. 4—This view showing switch cabinets entering the spray washer (right front) and painted, baked switch parts leaving the infra-red oven (left rear) illustrates the compactness of the finishing installation.

Becker Blue-Gray Infra-Red Baking Enamel, which is agitated by two air-driven rotating stirrers. To prevent air bubbles from forming on the dipped parts as they leave the dip tank, an artificial wave is produced in the tank by steel blades mounted on an eccentric shaft driven by a small motor through a speed reducer. This wave action washes the air bubbles past the area where dipped parts leave the paint and prevent surface defects. Viscosity of the gray enamel is controlled through the addition of Amsco coal tar base, high-flash naphtha.

Dipped parts pass over two sets of inclined drain boards, as shown in Fig. 3, so that paint drainings may be salvaged for re-use. Parts then continue in air through a space of 50 feet so that the enamel can begin to "set" before it is baked in the infra-red oven.

The overhead chain conveyor again doubles back on itself and transports parts through the 36-foot long Trumbull insulated infra-red oven. Here, parts are baked in 5½ minutes at a temperature of 325 deg. F. by the heat from 480 250-watt bulbs. A center exhaust removes fumes from the oven but recirculates part of the hot air back into the unit through air seals located at oven entrance and exit. Exhaust stacks are located above the air seals and, by means of stack dampers, oven conditions are regulated, so that a little fog and a slight pressure is maintained in the oven. Oven efficiency is thereby increased.

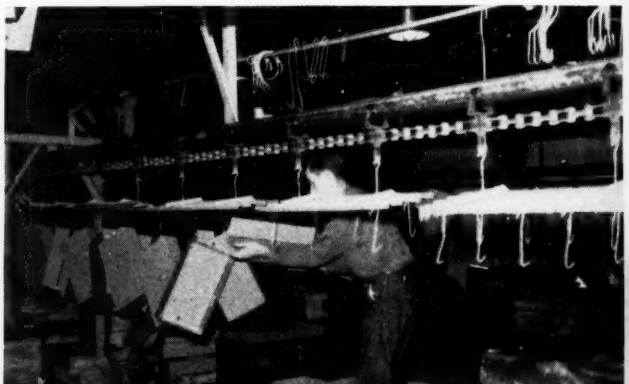

Fig. 5—Enameled switch parts are removed from the carriers and loaded on skids or into shop trucks. Directly behind unloader is an operator hanging fabricated parts on the conveyor for processing.

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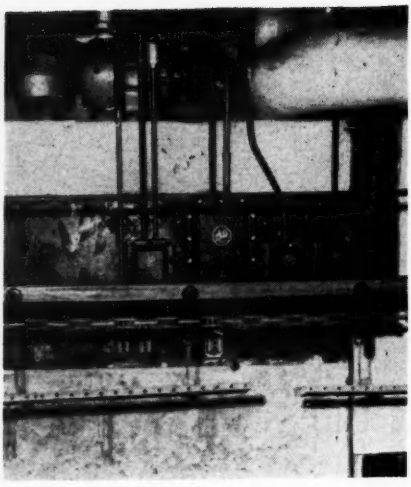

Fig. 6—This set of explosion-proof electrical controls operates motors and pumps on the pressure spray washer.

Completed parts leave the infra-red oven, as shown in Fig. 4, and cool as they travel over 70 feet of conveyor track. Cooling is speeded by a 36-inch fan mounted so as to force cooling air past parts on the conveyor.

At the end of the processing cycle parts are unloaded from the conveyor into a shop truck at an area adjacent to the loading area, and separated from it by a wide aisle (see Fig. 5).

Safety features incorporated into the finishing installation include explosion-proof motors, lights, and electrical controls. Figure 6 is a close-up of one set of controls. In addition, a 1200-gallon Fyr-Fyter foam system serves the unit through outlets located at strategic points in the paint system.

The modern equipment installed in this department makes possible a method of enameling which is a far cry from that formerly employed. Previously, parts were hand dipped, drained, loaded on racks, and pushed into ovens for baking. Figure 7 is a view of the department prior to its modernization.

The improvements made in this one department illustrate clearly one of the means that manufacturing plants may employ to reduce finishing costs, increase production, and improve the quality of the finish obtained.

Fig. 7—A view of the finishing department at Wadsworth prior to the installation of mechanical handling and processing equipment

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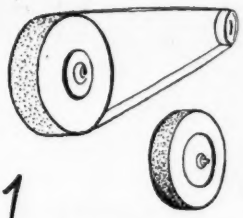

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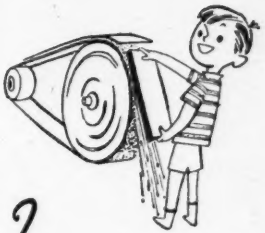

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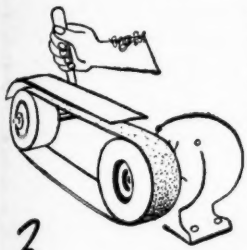

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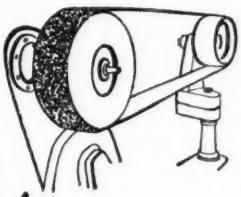

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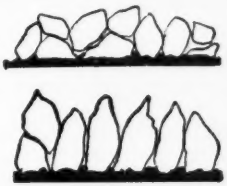

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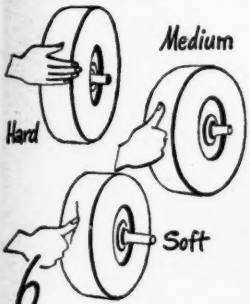

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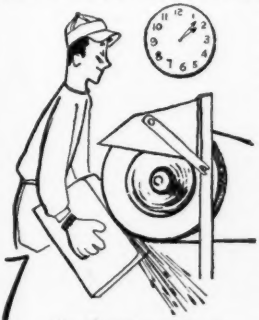

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THE 1949 Northeastern Regional Meeting of the Buffalo, Rochester, and Syracuse branches of the American Electroplaters' Society featured a symposium on the Purification of Plating Solutions.

The first speaker on the symposium panel was Oscar Stocker, Seymour Manufacturing Co., Seymour, Conn., who discussed the purification of plating solutions by chemical and electrochemical methods. According to Stocker, the best policy to follow in the plating room is not to permit a solution to become impure; however, the prime object of purification of plating solutions is to enable one to treat a contaminated bath so as to make it capable of operation free from trouble, with very little sacrifice of the constituents of which it is composed, and with a method as simple as possible.

The removal of metallic and organic impurities in plating solutions by chemical and electrochemical methods was classified by Stocker as follows: (1) precipitation and removal by filtration as a solid; (2) change in constitution by chemical treatment so that the impurity may be removed by other means, such as carbon filtration, or the effect of the impurity nullified; (3) electrolysis purification based on codeposition of the impurity with the metal of which the bath is made up. Chemical methods of analysis can be used to determine the pre-

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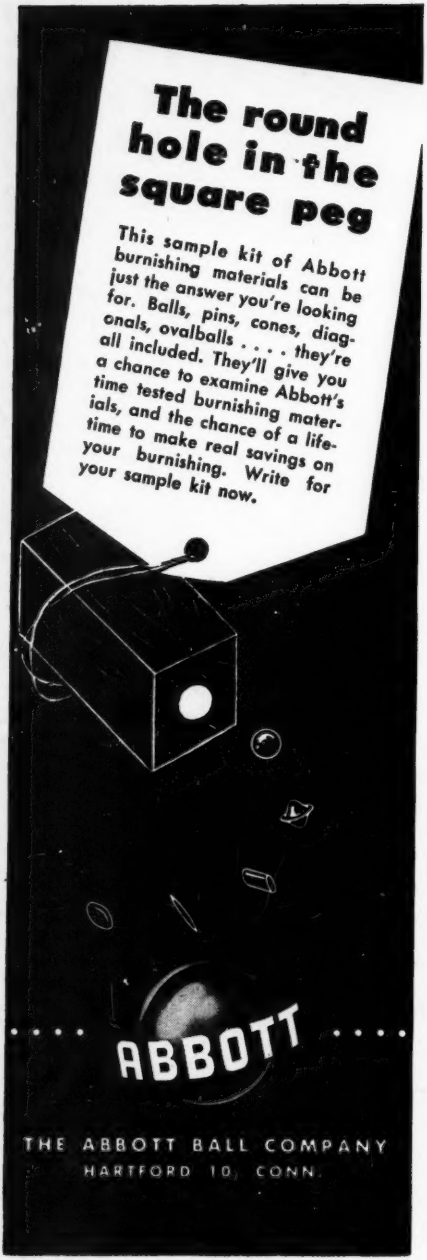
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sence of metallic impurities; however, in the case of organic contamination chemical analysis generally cannot be used, and it was pointed out that such tools as the bent cathode and Hull cell test have proven valuable in such cases. It was emphasized by Stocker that the success of the method chosen should not be measured by the fact that the removal of the impurity may not be quantitative, but whether enough of the impurity is removed to permit deposition without trouble.

Detection of Impurities

It was pointed out that impurities in plating baths are either metallic compounds, which can be identified by qualitative analysis, or organic compounds which cannot be identified by ordinary methods. The importance of realizing what can be accomplished through the use of plating tests was emphasized. The bent cathode test or the Hull Cell test were recommended for use. The details of making tests by the above methods have been described in the literature, and either will show the presence of impurities. The Hull cell test, will show the effect of impurities over the whole range of current densities; that is, from an extremely small value to a high value, and also may serve to identify an impurity by certain characteristics of the test panel deposit. The bent cathode test is simple to perform, and indicates the presence of impurities causing trouble in low current density regions, recognizable by the formation of a dark area in the right angle bend of the cathode.

A suggestion made to the platers attending the annual regional meeting was that they make use of these two test methods preparing either bent cathodes or Hull cell panels, using as test solutions their plant plating baths to which have been added certain definite and increasing amounts of impurities. If made under identical conditions of pH, temperature, and cur-

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rent density, these panels may serve as qualitative, and approximately quantitative standards for the presence of impurities in any plating bath. The guess-work regarding impurities, when trouble starts, is eliminated to some degree by repeating the test on the solution suspected of contamination and comparing the bent cathode or Hull cell panels with those made as standards.

Most platers have seen nickel deposits made from plating baths containing excessive metallic contamination. The most common defect caused by metallic impurities is a loss of color or darkening of the nickel deposit in the low current density recesses. Black streaks, black pits or gray deposits in all current density ranges are other noticeable effects of foreign metals. It has been pointed out in the literature that loss of ductility of nickel deposits is most noticeable with iron contamination. The bent cathode and Hull cell test are reliable methods for showing the presence of small amounts of metallic impurities in nickel plating baths.

Concerning the second class of impurities, namely organic materials, far less is known about their effect and the mechanism of their removal from plating solutions. One procedure that has been suggested with reference to nickel plating baths, if the presence of organic impurities is suspected, is that a bent cathode or Hull cell test be run in the laboratory to establish the presence or absence of metallic impurities. The metallic impurities should then be removed if found present. This will prevent an error in judgement as to the cause of the inferior deposits. A strippable deposit should then be produced and the ductility compared with a deposit from the same bath of known purity and performance.

However, it has been pointed out by nickel plating experts that organic contamination can produce other effects beside the loss of ductility in a nickel deposit. Lacy pitting, fine pitting in medium or high current density areas, black pits, laminated or spalling deposits and other defects have been attributed to organic contamination. Also, slight contamination from organic impurities may show up in cloudy deposits on medium or high current density areas with a loss of ductility. It has been found that in some cases still lower concentrations will not cause any visual change in the nickel deposits, but even traces can be detected by changes in the ductility of the nickel plate.

Methods of Purification

In continuing the discussion on methods for purification of plating baths, Stocker pointed out that chemical purification by precipitation involves the use of reacting chemicals which will either combine with the impurity to make an insoluble substance which will settle out, and be subse-

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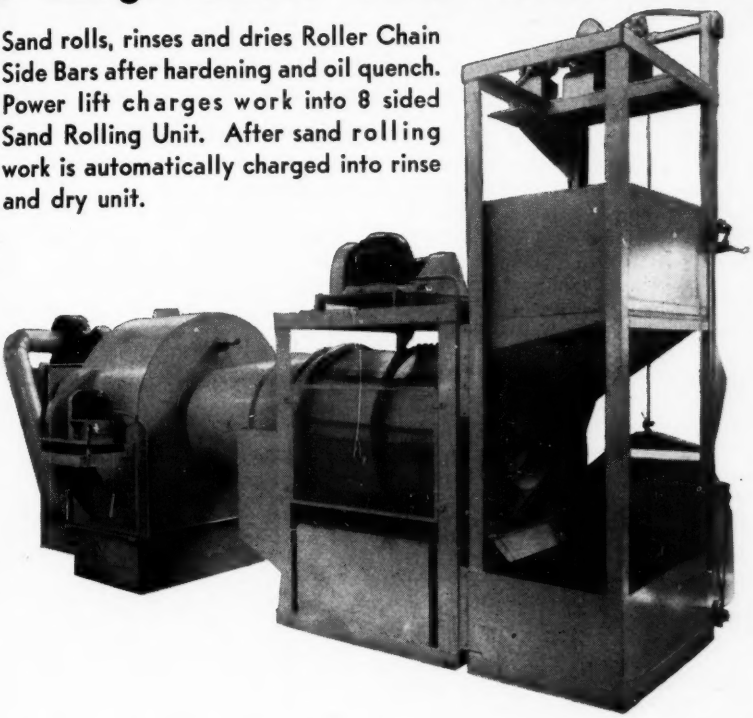

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quently removed by filtration, or by raising the pH, especially in nickel solutions, to the point where the impurity precipitates. The precipitation method is applicable to heavy metals in both acid baths or alkaline or cyanide baths. Precipitation by raising the pH is limited to solutions operating normally at a pH value lower than that at which metals will precipitate.

Co-deposition of the impurity with the metal of which the plating bath is composed is a very general method used for bath purification and details of this procedure as applied in plating plants will be given subsequently. Also, approved plant methods for removal of organic impurities using activated carbon treatment and filtration will be discussed, based on details given by W. A. Helbig, Darco Corporation who was the second speaker on the symposium panel.

According to Stocker, raising the pH of a nickel bath to approximately 6.2-6.4, electrometric, by the addition of nickel hydroxide or nickel carbonate, aided by the presence of a small amount of an oxidizing agent, will remove iron, aluminum, chromium in the trivalent form, zinc, selenium, cadmium, and in fact, practically any heavy metal including copper in the bivalent state. It is recorded in the literature that ferric iron begins to precipitate at pH 4.7, ferrous iron at 5.5, zinc at 5.8-6.0, trivalent chromium at 6.0-6.2, and nickel hydroxide at 6.6, all electrometric values.

In raising the pH of nickel solutions it has been found that dry nickel carbonate will give a value of 6.0, freshly precipitated nickel carbonate up to 6.4, and freshly precipitated nickel hydroxide up to 6.9, electrometric. The latter two are much more effective with smaller amounts being required. All additions of the above chemicals should be made as a wet slurry of the chemical in hot water, and added

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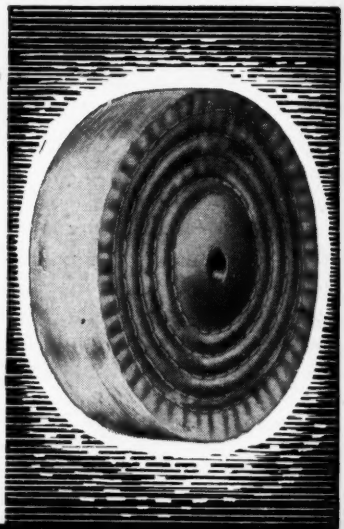

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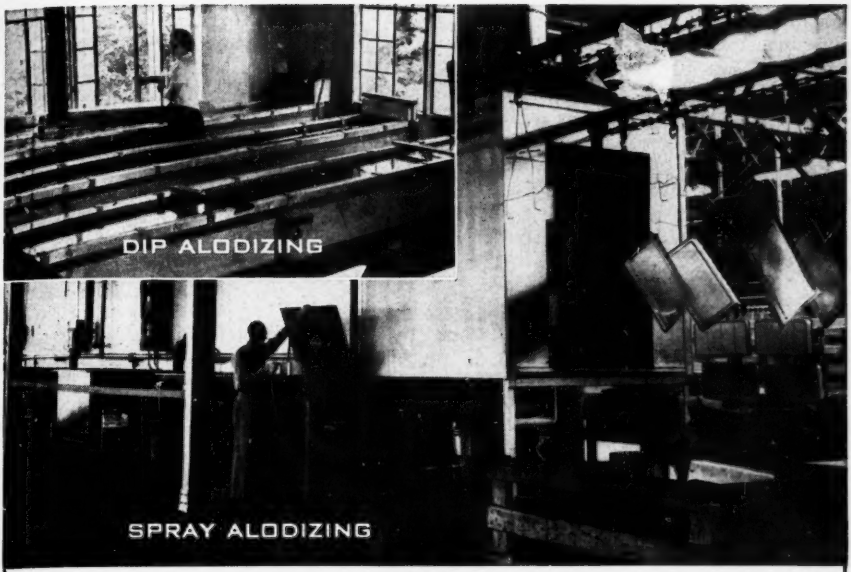

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gradually with continual and vigorous stirring. It has been pointed out that the more gradually the increase in pH is accomplished, the less will be the loss of nickel metal which will occur. Any treatment involving the addition of solids to the bath, with subsequent precipitation, obviously requires that the anodes be first removed from the tank. Such treatments are preferably carried out in a separate tank especially reserved for this purpose.

According to Stocker the practice generally followed in purification is as follows: (1) the bath is heated to about 140 deg. F., and a means of agitation provided; (2) nickel carbonate is added as a wet slurry, with much stirring; 2-4 lb. and sometimes as much as 6 lb. of nickel carbonate per 100 gal. of solution are used; (3) a small amount of an oxidizing agent may be added to the bath; about ½ pint of 100 volume hydrogen peroxide per 100 gallons of plating bath has been recommended—this will oxidize the iron to the ferric condition; (4) the bath is thoroughly stirred, after which the solids may be allowed to settle, after which they are filtered off.

There has been considerable recent activity in the development of electrolysis methods for purification of plating baths, particularly for bright nickel plating solutions. One method that has been recommended involves the use of a corrugated cathode. When the maximum area of properly shaped cathode is used, with proper agitation and current density, rapid purification from metallic impurities in a nickel plating bath can be expected.

It has been reported that copper and lead contaminants will plate out very satisfactorily at about 2 to 4 amp./sq. ft., with zinc and iron impurities coming out better at 6 or 7 amp./sq. ft. Thus by using a cathode having symmetrical variations in recesses and high points, and using an overall current density of 5 amp./sq. ft., the proper current density requirements for all four metals can be satisfied. When an overall current density of 5 amp./sq. ft. is applied to this corrugated type of cathode, the copper and lead deposit out in the recessed areas and the zinc and iron will deposit out on the high points. Commercial practice has shown that the ordinary corrugated black iron sheets are among the most satisfactory cathodes for this method of purification involving all four metals named.

Reference was made by Stocker to recent work carried out on continuous methods for electrolytic purification of nickel plating baths and recommendations for commercial practice, such as have been made by B. C. Case. Numerous designs for continuous purification tanks have been developed and used with existing equipment or in conjunction with new equipment.

The amount of continuous electrolytic purification per gallon of nickel solution required to insure a sufficient-

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ly clean plating bath has been studied by B. C. Case by recording the time of each treatment and the frequency of treatments for several bright nickel installations. Certain plating plants were studied because it was known that the products plated at these plants were of such shape and material to cause a high rate of metallic contamination. These investigations showed that if the purification tank was designed to provide 0.05 ampere-hours per gallon of solution per hour of operation, the worst cases of metallic contamination would be kept under control. On this basis a 1000-gallon bright nickel solution would require 50 amperes flowing in the purification tank. Using the preferred current density of 5 amp./sq. ft., the tank should then have 10 sq. ft. of properly shaped cathodes. While it should be realized that choice of cathode size influences the dimensions of the purification tank, one point to keep in mind is that the tank should always be narrow in one or two dimensions to increase the rate of solution flow through it.

While nickel plating solutions have been used for illustration, it was brought out by Stocker that electrolytic purification can be applied to advantage to other types of plating solutions. Its successful use on copper baths, both alkaline and acid, as well as on cyanide zinc and cadmium, bears out this statement. The method is generally referred to in the industry as dummy plating at low current densities. In most cases the current density is the only variable to be adjusted. An important advantage of the electrolytic method in many of these applications is that the plating solution does not have to be transferred to a storage tank for treatment, since the electrolytic method is impractical to apply except in a plating tank. Precipitation methods are also used for the other

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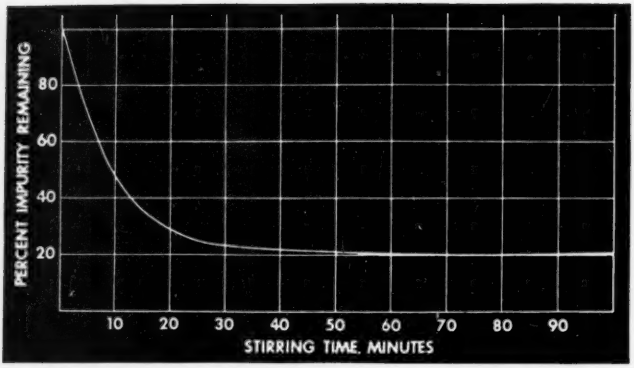

Fig. 1—The relationship between stirring time and adsorption of impurities is indicated in the typical purification curve for activated carbon shown above, which was prepared by the Darco Corp., New York 17, N. Y.

types of plating baths, depending upon the impurity to be removed.

The application of activated carbon treatment for purification of plating solutions was also discussed by Stocker, wherein it was pointed out that it is desirable to first conduct trial purifications in the laboratory, followed by plating tests on the treated solution, to determine the conditions for removal of the contaminants. Activated carbon treatment of plating baths was also discussed by W. A. Helbig.

Stocker emphasized the importance of using a separate tank for carbon treatment. Quantities of ½-4 lb. of activated carbon per 100 gallons of plating solution were recommended; however, it was pointed out that there are instances where laboratory purification tests followed by plating tests have shown ⅛ lb. activated carbon per 100 gallons of solution to be effective. Filtration after carbon treatment is an important factor.

Where the type of bath permits, circulation of the solution through a filter charged with activated carbon is a useful complementary treatment to continuous low current density electrolytic purification. When metallic and organic impurities are continuously being removed by these two units, and when the amounts of impurities are constantly maintained at levels safely below the maximum allowable limits, in most instances the quality of plating will be more uniform and there will be fewer rejects and less rework loss.

Filtration and Activated Carbon Treatment

W. A. Helbig, the second speaker on the symposium panel, stated that there are two physical means for purification of plating solutions, namely, filtration, for the removal of insoluble, suspended impurities, and adsorption, for removal of the many harmful impurities which cannot be separated by simple mechanical filtration, but are capable of being held on an adsorptive surface, such as activated carbon. According to Helbig, activated carbon may be visualized as solid foam, that is, a large surface within a rigid granule or particle structure of relatively small volume. Its purification action is related to the extremely large surface it possesses.

To remove impurities activated carbon particles must get in contact with them. Except for certain limited types of application, activated carbon is produced as a fine powder—the form with the maximum surface area. In the purification procedure, this powder is agitated with the solution to be treated, thus providing maximum surface contact. To make this contact complete, stirring must be continued over a period of time. Relationship between stirring time and adsorption of impurities is indicated in the typical purification curve shown in Fig. 1.

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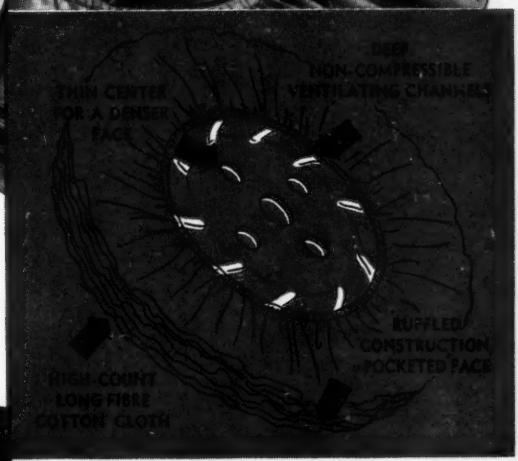
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Helbig pointed out three important considerations to be kept in mind in plating room filtration operations. The first of these points emphasized was the solids capacity of the filter. For economical and efficient filter operation, it is necessary to have sufficient solids capacity so that filtration does not have to be interrupted at excessively frequent intervals in order to clean the filter. It should be remembered that the solids capacity of a filtration system should be sufficient to accommodate both the solids occurring in the solution, plus filter aid and activated carbon when used.

The second important point to be considered is the effective filter area, usually expressed in sq. ft. of filter surface. The effective filter area can be readily calculated for any filter; it is the total area of cloth, filter paper, or filter pad upon which cake of solids can be deposited. The third important point to be considered is the filtration rate or the rate of flow through the filter, usually expressed in gallons per sq. ft. per hour. Filtration rate refers to the speed with which the liquid passes through the surface provided for filtration. If the filtration rate is excessive, that is, if too large a number of gallons are being forced through too small a filter area, within a given time, the adverse results of a compacted cake of solids, and rapid pressure rise will be obtained.

One recommendation that has been made is that in electroplating solutions the filtration rate should be between 25 and 50 gallons per hour per square foot. Acid solutions can usually be filtered somewhat more rapidly than alkaline solutions, since the latter are more likely to contain a greater proportion of gelatinous, compressible metallic precipitates.

For good filtration, the operator should begin the filtration at the lowest pressure possible and increase the pressure as filtration progresses, only to the extent necessary to maintain a constant flow of filtered liquid. By observing this rule pressure is increased only in proportion to the flow resistance caused by the solids accumulating on the filter. If pressure is increased too fast in an effort to secure faster flow, the compression of the solids as they are deposited causes a rise in flow resistance out of all proportion to the rate at which the solids build up on the filter medium. The net result is that although for a brief period a faster flow is obtained, the rapidly increasing flow resistance may call for cleaning of the filter much sooner than should be necessary.

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Demineralizing and Softening Water for the Plating Room

In discussing the treatment of water for plating room use by resin demineralizers, Harold Faint, Industrial Filter and Pump Manufacturing Company, the third speaker of the regional meeting symposium panel, pointed out that

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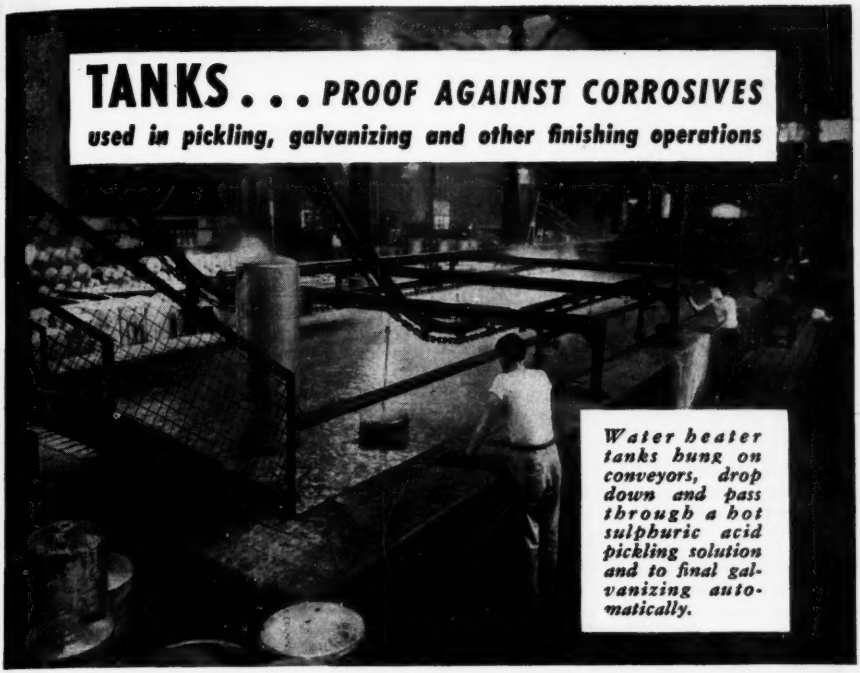
used in pickling, galvanizing and other finishing operations



Water heater tanks hung on conveyors, drop down and pass through a hot sulphuric acid pickling solution and to final galvanizing automatically.

Photograph courtesy Rheem Manufacturing Co.

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the first thing to do is to find out what is in the water. In addition to water analysis, other important considerations are the volume of water to be used, and the storage and distribution system for the treated water.

There is little doubt that more and more the electroplater is considering the water he uses as a possible source of trouble. In room temperature solutions various troubles have been traced to both the water used in preparing and maintaining plating baths and that carried into the baths by drag-in from preceding rinses. It has been found out that unfavorable characteristics which might remain unnoticed in low current density baths are more evident in high current density solutions in which bright or heavy deposits are applied. Evaporation losses are high in elevated temperature baths. When water is added to compensate for these losses the constituents originally present in the water become concentrated with the result that a soft water does, in effect, become hard water and hard water becomes abnormally hard in the plating tank. Some soluble mineral constituents that may be brought into the plating solution with water are iron, aluminum, magnesium, calcium, sodium, potassium, silicon, carbonate, sulfate, chloride, phosphates, and possibly nitrates or nitrites (indicates sewage contamination).

* * *

Formulating Chlorinated Rubber Finishes

SOME of the important points to be kept in mind when formulating chlorinated rubber finishes were recently brought out by J. B. Martin, Hercules Powder Company, in "Canadian Chemistry & Process Industries." First of these points to be emphasized was that a high percentage of aromatic

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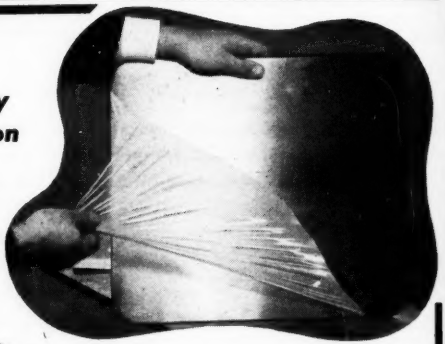

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Taking on this problem, enterprising Unichrome engineers came up with a special formulation designed to fit *all* the production requirements – and a difficult set of specifications they were indeed. It ended the rejects alright – but what's more, *it cut 25% off former finishing costs!*

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solvent should be present. According to Martin, it is usually impossible to incorporate a chlorinated rubber into a varnish which has been thinned with an appreciable abount of mineral spirits, or use chlorinated rubber with an alkyd which has been cut in as high as 30 to 50 percent mineral spirits.

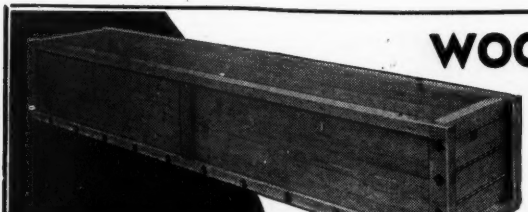
Secondly, it was stated that for chlorinated rubber to be miscible with an alkyd, the alkyd must contain a fairly high percentage of oil modification. Chlorinated rubber is miscible with the long oil alkyds, and certain medium oil alkyds, but shows immiscibility with the short oil and many of the medium oil length alkyds. The third point that was brought out is that when chlorinated rubber finishes are used outdoors they must be pigmented because chlorinated rubber is very sensitive to ultraviolet light. When pigmented, excellent durability on outdoor exposure is obtained. Another fact discussed was that chlorinated rubber solvents used in chlorinated rubber formulations should be of the non-water sensitive or water-miscible type to obtain good can stability. Aromatic solvents such as xylol, toluol, hi-flash naphthas, Solvasols, Solvessos, etc., were recommended by Martin for use in preference to ethyl acetate, the Cellosolves, and other water-sensitive solvents.

According to Martin, chlorinated rubber paints are pigmented in the usual manner. Pigments should be ground or rolled in pebble mills in preference to steel ball mills in order to avoid iron contamination. Acid sensitive pigments, such as ultramarine blue, should be avoided.

Grades and Viscosity of Chlorinated Rubbers

According to Martin there is only one grade of chlorinated rubber manufactured. This material analyzes approximately 67 per cent chlorine. Considering the five carbon rubber unit it can be seen that introducing three chlorine atoms into this unit results in a product of 61.3 per cent chlorine. Four chlorine atoms gives a product of 68.2 per cent chlorine—thus, the commercial product of 67 per cent chlorine is presumably a mixture of these two products.

Due to its high chlorine content, the chlorinated rubber material is non-inflammable. While the rubber base itself is of high viscosity and insoluble in most of the common paint solvents, the material when chlorinated loses viscosity and when the chlorine content is raised to 67 per cent it becomes soluble in many of the common solvents used in the paint industry, and also becomes compatible with many of the long and medium oil alkyd resins and other resins commonly used in the paint industry. Chlorinated rubber, however, retains the properties of the original rubber of alkali, acid, and chemical resistance. It was also indicated by Martin that chlorinated rub-



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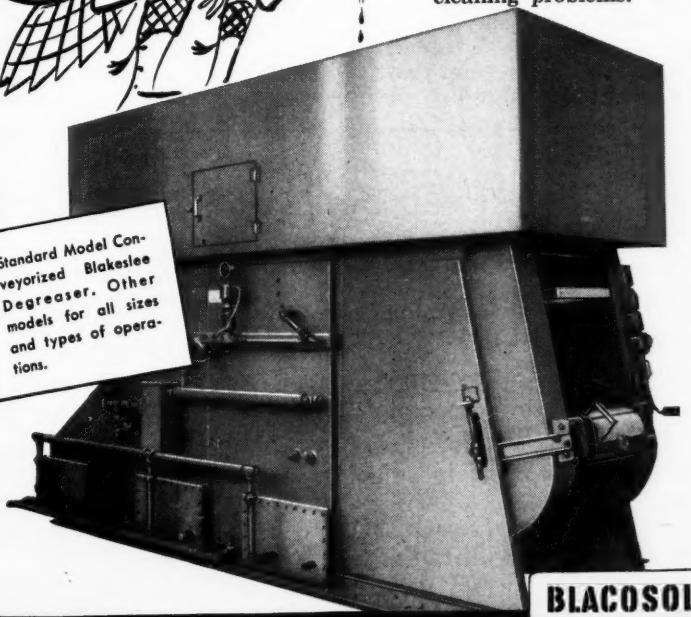

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ber is manufactured in various viscosity types for different specific end uses. The lower viscosities, 20 and 10 centipoises, are principally used in the coating field, both as bases for acid and alkali resistant paints, and for alkyd resin and varnish finishes.

It was brought out by Martin that an unmodified chlorinated rubber film has 90 per cent of the hardness of glass; thus, it can be seen that it can be modified with an appreciable quantity of softer materials and still produce a reasonably hard paint film. It was emphasized that the selection of a modifier and the quantity of modifier used is the most critical step in formulating a satisfactory chlorinated rubber-base paint. It was suggested that the chlorinated rubber be modified with an appreciable amount of phenolic varnish or alkyd resin in order to obtain the best adhesion, gloss, and toughness for a paint that is to be applied to metal, wood, or concrete.

It was also stated that to formulate a paint for extremely corrosive conditions, modifiers should be used which are as chemically inert as the chlorinated rubber. Examples of these, cited by Martin, were liquid chlorinated paraffin as a plasticizer and solid chlorinated paraffin as a resin. A typical vehicle formula given for extreme acid and alkali resistance was two parts by weight of chlorinated rubber to one part of liquid chlorinated paraffin and one-half part of solid chlorinated paraffin. While a finished paint containing this vehicle would have excellent chemical resistance to weak and strong acids and alkalis, and other corrosive chemicals, the gloss, adhesion, and toughness would be only fair.

According to Martin, if as little as 5 per cent thermolyzed tung oil or an alkyd resin is incorporated into this vehicle, the qualities of adhesion and

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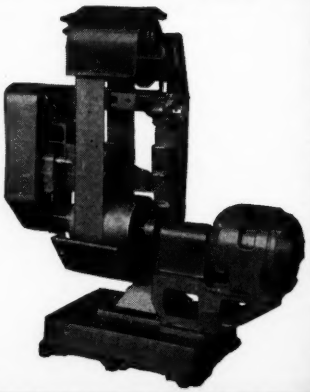

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toughness are materially improved. Also, if as much as 25-50 per cent phenolic varnish or alkyd resin is incorporated into the vehicle, good toughness and adhesion can be obtained, but the resistance of the paint, especially to strong alkalis, is reduced. In formulating a chlorinated rubber paint of this type the finishing engineer may have to compromise between chemical resistance on one hand and toughness and adhesion on the other.

Fortification of Alkyds and Phenolic Varnishes

Another field for use of chlorinated rubber pointed out by Martin is in the fortification of alkyd finishes and phenolic varnishes. In this case, usually 25-35 per cent of the vehicle is replaced by chlorinated rubber. This materially increases the speed of drying and the initial hardness of the finish. Concerning quantities to be used, it was stated that amounts of chlorinated rubber under 40 per cent usually can be incorporated without detracting seriously from the gloss of the finish. Furthermore, the chemical resistance of the original alkyd finish or phenolic varnish is materially improved. While a finish of this type will not withstand strong acid or alkali conditions for any length of time, it is quite satisfactory for resistance to dilute acids, soap, and other weak alkaline solutions. In alkyd and varnish finishes it also speeds drying and increases the hardness of the coating.

A new 36-page booklet, **"Heat Treating and Pickling of Armco Stainless Steels,"** published by Armco Steel Corporation, Middletown, Ohio, presents comprehensive and up-to-date information on heat treating and pickling methods for stainless steels. Recommended procedures, based on practical experience and extensive work in Armco's Research Laboratories, are given in detail so that full advantage can be taken of the valuable properties of stainless steel.

How to Step Up Efficiency in drying, baking, preheating, and dehydrating operations with the use of Jensen New Principle "Dual Heat" Infra-Red Ovens is the topic of a four-page two-color catalog now being distributed by Jensen Specialties, Inc., 9331 Freeland, Detroit 28, Mich. Typical installations are pictured and described.

"Flosol Soldering Fluxes" available from the American Chemical Paint Company, Ambler, Pennsylvania, are described in a technical service data sheet released by the company. The applications for which the products serve most efficiently are described, and the characteristics of the foldering fluxes outlined.

The weight of a gallon of paint or the specific gravity of a paint can be quickly determined by the use of cups, which are described in a leaflet available from Henry A. Gardner Laboratory, Inc., Bethesda 14, Maryland.

Industrial Oven Bulletin. The various standard type ovens for industrial drying, baking, and heat treating processes available from Michigan Oven Company, 4544 Grand River Ave., Detroit 8, Mich., are illustrated and described in Bulletin 749. A brief description of the functions and temperature ranges available in each type or design of oven is included.

Steam Cleaning Portfolio. The Du-Bois Chemical Company, Industrial Division, Cincinnati 3, Ohio, is offering a portfolio on the subject of steam cleaning to aid industrial plants in obtaining the utmost efficiency in their steam cleaning operations.

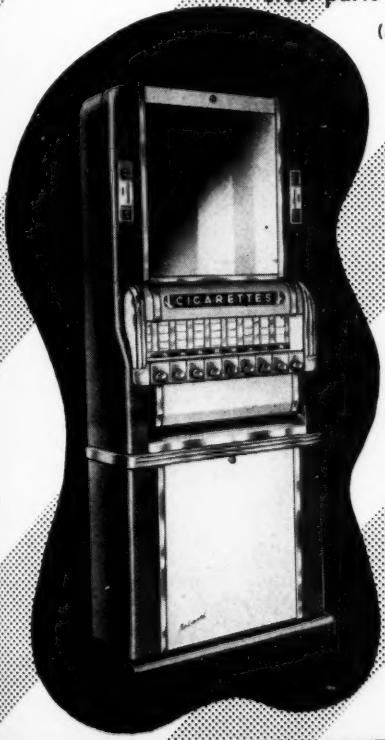
The many applications of steam cleaning and its place in economical plant maintenance are discussed. The chemical requirements of a good steam cleaning compound are outlined, telling what to look for in selecting the material to be used and the kind of results to be expected. Safety to personnel, absence of disagreeable odors and fumes, safety on metals and equipment parts are stressed.

Other features are an instruction chart on the maintenance of steam cleaning equipment, and case histories describing the use of DuBois Sprex AC in steam cleaning operations.

...in appearance and utility

● The working parts of the Sheridan Silver Streak Pneumatic Rifle are fabricated from phosphor bronze or steel. Bronze parts are nickel plated and given a satin finish. Bolt handles are bright nickel plated and other steel parts are finished in blue-black Dulite.

(Photo courtesy Sheridan Products Inc., Racine, Wis.)



● The body of the National Cigarette Vending Machine, Model 9M, is attractively finished in maroon metalescent baked enamel. Trim strips are chromium plate and stainless steel. The center panel is finished in rose Hammerloid baked enamel.

(Photo courtesy National Vendors Inc., St. Louis, Mo.)

NEWS of the Industry

COMPANIES

THE ELECTRO-CHEMICAL SUPPLY AND ENGINEERING COMPANY, Paoli, Pa., has announced an important change in the manner of packing and shipping Brimsto, the plasticized sulphur-base acid-proof cement.

Brimsto was formerly shipped in five or ten pound ingots, packed in fibre cartons, weighing 50 pounds net. It is now put up as small wedge-shaped wafers and packed 100 pounds to a bag.

The purpose of this new method of packing is to make handling easier (no breaking or chipping of ingots) and melting faster. Like the former ingots, it will not be affected by water and it is just as clean to handle.

THE MAGNUS CHEMICAL CO., INC., Garwood, N. J., manufacturer of automotive and industrial cleaning chemicals and equipment, has announced the inauguration of a free production test cleaning service.

Companies wishing to test a new cleaning method or material can eliminate the time, expense and bother of conducting cleaning tests on their own premises by taking advantage of this new service. At Magnus, where a wide variety of cleaning equipment and chemicals are available in a special building provided for the purpose, full scale production cleaning tests can be conducted under actual working conditions.

The building is equipped with four mechanically agitated cleaning machines featuring three different types of agitation. These are in addition to a turntable type spraying and rinsing machine.

Two different types of cleaning tanks have also been installed, along with a drying oven, deburring and burnishing barrels, a steam gun and solvent cleaner sprayer.

Both heated and unheated machines and tanks are available.

With the above equipment it is now possible to determine not only the best chemicals, equipment and method for achieving a desired cleaning result, but actual cleaning times and costs can be accurately recorded as well.

A view of some of the mechanical cleaning equipment in the Magnus test cleaning unit

THE HARSHAW CHEMICAL COMPANY, Cleveland 6, Ohio, has solved the problem of shipping anodes, with an in-

Fig. 1—Assembling the new Harshaw anode package

expensive simple pallet which can be thrown away after use.

In making up the package the anodes are placed in a holding jig and corrugated board placed above, below and between the anodes. The steel strap is then

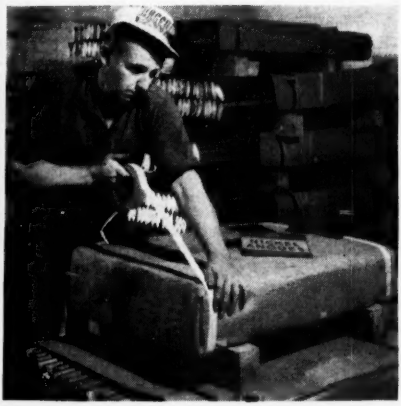


Fig. 2—Wrapping and sealing the Harshaw anode package

threaded through the two holes in the skid and up over the anodes as shown in Figure 1. Drawing up the strap tight brings the skid up to the anodes. The anode package, save for the skids, is then wrapped with burlap as shown in Figure 2, sealed, labelled and is ready for shipment. This design provides all the advantages of a pallet shipment with none of the disadvantages. It is essentially a built-in pallet.

Although the finished package weighs 500 or 1,000 pounds, as the customer selects, yet it is easily handled with a fork lift, or hand truck because of the built-in skids, as shown on Figure 3.

Since the package is inexpensive it is not necessary to return it, which saves freight, not to say deposits commonly charged for pallets.

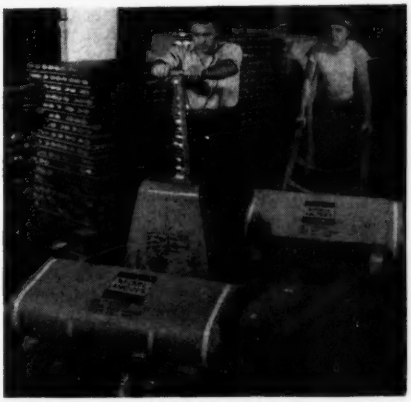


Fig. 3—Showing finished Harshaw palletized anode package with built-in skids on hand truck and lift truck

The user will find that these packages stack easily and quickly, and are readily opened. Since the package is under tension, the one who cuts the strap should stand at the end, and not the side, of the package when it is opened.

MAGNA MANUFACTURING CO., INC., announces the removal of its New York City executive and sales office at 444 Madison Avenue to its plant located at Haskell, New Jersey. All communications pertaining to sales, orders, and shipments are requested to be sent to this new address.

The newly created Process Engineering Department of **DETREX CORPORATION**, Detroit 32, Mich., will be headed by George W. Pew, according to an announcement by A. O. Thalacker, vice-president and general manager.

In addition to handling engineering requirements of Detrex factories—other than product design—this department will investigate and make recommendations on operating methods and fabricating processes. It will also exercise complete quality inspection control on all manufactured items except solvent and cleaning compounds. This includes degreasing and metal parts washing machinery, drycleaning equipment, oil-extraction plants, and food processing equipment.

The Arthur B. Sonneborn Company, with offices in Detroit, Grand Rapids, and Flint, Michigan, and Toledo, Ohio, has been appointed a representative of **THE ELECTRIC PRODUCTS CO.**, Cleveland, Ohio, manufacturer of electroplating motor-generator sets. E. G. Schroeder, former Electric Products district manager in Detroit, has joined the Sonneborn organization.

FREE

TEST PAPERS

for testing

ZINC

SOLUTION

Sulphur Products Co.

GREENSBURG 6, PA.

Sole Producers of

McKeon's Zinc-Brite

Glidden, Ga., is a new Central of Ga. Railway Co. station established solely to facilitate shipments to and from the huge new industrial development which is being constructed here for the **GLIDDEN CO.**, Cleveland, Ohio.

Located near Macon, Ga., Glidden will be a permanent shipping point for the margarine plant which the company completed here recently. The firm plans to construct an edible oil refinery and a paint and varnish plant at a cost of several million dollars when conditions permit.

Dr. John F. Thompson, president of **THE INTERNATIONAL NICKEL COMPANY OF CANADA, LIMITED**, has announced the retirement of Frederick P. Bernhard, comptroller.

Mr. Bernhard has the distinction of having served longer than any other active employee of International Nickel, and on July 31 completed fifty years of consecutive service with the Company. He has been comptroller of The International Nickel Company of Canada, Limited, and its United States subsidiary, The International Nickel Company, Inc., since 1933.

MAAS & WALDSTEIN CO., manufacturer of lacquers, enamels, and synthetic finishes, Newark, New Jersey, announces the twenty-fifth anniversary of the establishment of the Mid-Western Division which is located at 1658 Carroll Avenue, Chicago 12, Illinois.

During the past quarter century this division has become one of the most important supply links in the M & W Organization, offering standard and special M & W Finishes to manufacturers in the entire mid-west, from Eastern Ohio to Western Oklahoma; from Texas to the Great Lakes.

Manufacturers in the East are supplied from the company's main plant in Newark, New Jersey, and in the West are supplied from the company's Pacific Coast Division known as the Smith-Davis Co., located at 10751 Venice Blvd., Los Angeles 3, California.

The company expresses sincere thanks to all its customers who have helped make the Silver Anniversary possible and assures them that high M & W Standards will continue to be maintained, as well as the customary efficient, personalized service from the company's sales engineers.

THE SELAS CORPORATION OF AMERICA, Philadelphia, has taken over the industrial dehumidification equipment activities of the Equipment Section, Engineering Division, The Davison Chemical Corporation, Baltimore.

R. S. Van Note, formerly manager of the Equipment Section, has joined Selas as manager of the Dehydrator Division.

A Canadian subsidiary to manufacture fluorescent lamps and other lighting equipment has been formed by Sylvania Electric Products Inc., it was announced by Don G. Mitchell, president. The new company, to be known as **SYLVANIA ELECTRIC (CANADA) LTD.,** has leased a plant from the City of Drummondville in the Province of Quebec.

Officers of the Canadian company are: F. J. Healy, president; R. H. Bishop, vice president; William O'Keefe, secretary; and M. F. Balcom, treasurer. Mr. O'Keefe, who is general foreman at the Danvers, Massachusetts plant of Sylvania Electric Products Inc., will manage the plant, while J. C. Hicks, formerly Kansas City, Missouri division manager, has been named sales manager, with officers in Montreal.

Elliot Schuyler Phillips, chairman of the board and president of **DEVOE & RAYNOLDS COMPANY INC.,** celebrated his twenty-fifth year as head of the one hundred ninety-five year old paint company recently.

Mr. Phillips began his career with Devoe & Raynolds Company while a student of Yale, working during the summer vacations. In 1915, he became a permanent employee. In 1922 he was made a director and vice president of the company. He was promoted to general manager a year later, and in 1924 he was elected president. His father, William H. Phillips, was president from 1919 to 1923.

During the expansive years of his leadership, Devoe & Raynolds Company added the Jones-Dabney Company, Beckwith-Chandler Company; Truscon Laboratories; Wadsworth, Howland & Company; Peaslee-Gaulbert Paint & Varnish Company, and most recently, The Bishop-Conklin Company, to its roster.

Elliot Phillips is a member of the Industrial Committee of Commerce and Industry Association of New York and a member of the Advisory Board of the Manufacturers Trust Company, New York City.

Dr. John F. Thompson, president of **THE INTERNATIONAL NICKEL COMPANY OF CANADA, LIMITED,** has announced the appointment of Cameron Risby Whitehorne as comptroller and William F. Munday as deputy comptroller of The International Nickel Company, Inc. Mr. Whitehorne succeeds Frederick P. Bernhard, who retired on August 1, and Mr. Munday succeeds Mr. Whitehorne, who since 1933 has been deputy comptroller of both companies and also of Whitehead Metal Products Company, Inc., an affiliate.

THE WIRE COATING AND MANUFACTURING CO., 395 E. 131st St., Cleveland 8, Ohio, supplier of the Wico Brite Copper plating process, has announced that all of its products, heretofore designated as Wico, are now being designated as W.C.M.

LINK-BELT COMPANY has announced that, in the process of expanding its facilities to serve the customer, the following offices have been moved into larger quarters:

The Cleveland office, headed by Paul V. Wheeler, district manager, is now located at 314 Hanna Bldg., Cleveland 15, Ohio.

The Baltimore office, of which Charles C. Wiley is district manager, is moving to 2315 St. Paul St., Baltimore 18, Md.

The L-B office in Huntington, W. Va., headed by David W. Stevens, will be located at 1009 Fifth Ave., Huntington 1.

The office in Newark, N. J., headed by John D. Riley, district manager, is now located at 212 Essex Building, 31 Clinton St., Newark 2.

GOLD PLATING SOLUTIONS
In All Colors
Guaranteed 100% Pure Gold Content
Troy Weight - Color Constant
Tarnish Resistant
Proven Quality by the Acid Test
Write or call our experts about your plating problems
Davis-K-Products Co.
54 West 22nd St., New York 10, N. Y.
Oregon 5-0094
5-0095

Walter C. Gold, Incorporated, 112 N. Front St., Philadelphia, Pa., has been appointed in the Philadelphia area by the **DANIELS PLATING BARREL & SUPPLY CO.**, Newark 5, N. J., for sales and services of Daniels plating barrel equipment. This territory covers Pennsylvania, east of Pittsburgh.

The corporate name of Leon Finch, Ltd., Los Angeles, California, has been changed to **AMERICAN-MARIETTA COMPANY OF CALIFORNIA.**

In October, 1945, the American-Marietta Company acquired the ownership and has operated Leon Finch, Ltd. as a wholly owned subsidiary. This company is a leading West Coast manufacturer of lacquers and enamels for finishing industrial products.

NEW POSITIONS

H. D. McKINLEY has been appointed works manager of the new degreasing-solvent manufacturing plant being erected by Hooker-Detrex, Inc., at Ashtabula, Ohio.

Mr. McKinley, who collaborated in the design, erection and initial operation of the Tacoma, Washington, plant of the Company, is transferring from his position as manager of the solvents division of Detrex Corporation.

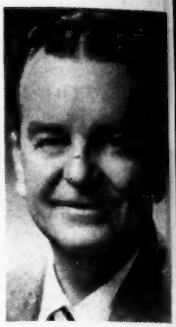
Hooker-Detrex, Inc., is a jointly owned subsidiary of Hooker Electrochemical Company, Niagara Falls, New York, and Detrex Corporation, Detroit, Michigan. Detrex Corporation markets all the solvent produced by the subsidiary company.

Carl J. Schumann, president of the Hilo Varnish Corporation of Brooklyn, N. Y., has announced that **BENJAMIN DREBSKY** and **SIMON CHIPKIN** have become members of the Hilo organization.

Mr. Drebsky represents the Trade Sales Department of Hilo in Brooklyn, where he is well known to the dealer trade.

Mr. Chipkin has been assigned to the Hilo Laboratory where he will devote all his time to trade sales products.

The Finishes Division of the Du Pont Company has announced the appointment of **THEODORE J. MITCHELL** as industrial sales manager for the San Francisco region.



Theodore J. Mitchell

Mr. Mitchell has been with the Du Pont Company since 1926, and for many years has specialized in finishes for the petroleum, aviation, marine, railway, and steel fabrication industries. Before going to San Francisco he was manager of special industrial sales for the Chicago region. He originally is from Little Rock, Arkansas, and joined the Du Pont Company at Tulsa, Okla.

The appointment of **DR. PAUL J. BRODEUR** as chief chemist of the Metal Finishing Division of the Pyrene Manufacturing Company, Newark, New Jersey, has been announced by L. E. Eckelmann, manager of the division. At the same time, Eckelmannn indicated that there would be a marked expansion of the division involving a considerable increase in size of plant area and production facilities.

This division of the company was formed originally to handle the finishing of the company's own fire extinguisher products. For years, however, it has been doing a large volume of job work for other manufacturers, parts and repair companies and plating jobbers. In addition, it installs, for other companies, various finishing processes such as Parkerizing, Bonderite and Pyrene Bright Nickel.

Dr. Brodeur, who has had wide experience as a technical expert in metal finishing, has devoted specialized attention to the field of hard chromium plating.

At a recent meeting of the board of directors, E. F. Maneely, president of the Maneely Chemical Co., Philadelphia, Pa., announced the appointment of **HENRY J. DOUGHERTY** as secretary of the Company.

Mr. Dougherty, has been head of the Real Estate Division of an affiliated company, the John Maneely Co., since 1942.

Bonderite is Right for aluminum...

You, too, can have the advantages of Bonderizing on your aluminum! You can have assured, lasting paint adhesion, protection from corrosion and oxidation, and prevention of peeling and chipping.

Bonderizing for aluminum is effective, economical, quick, and simple. On sheets or castings of this metal and its alloys, the Bonderite crystals form a tight nonmetallic phosphate coating which becomes part of the metal itself. Paint finish, applied over Bonderizing, is there to stay, and retains its fine appearance through years of hard service.

The same line that Bonderizes your aluminum may be used for mixed production, protecting and preparing zinc and steel parts for paint, too.

Your aluminum products deserve the appearance and service protection of Bonderizing. Get full information now!

SEND FOR TECHNICAL BULLETIN!

Get details on Bonderizing for aluminum. Write today for free technical bulletins.

Bonderite, Parco, Parco Lubrite—Reg. U. S. Pat. Off.

Parker

PARKER RUST PROOF COMPANY
2172 East Milwaukee Ave.
Detroit 11, Michigan

BONDERITE—Corrosion Resistant Paint Base • PARCO COMPOUND—Rust Resistant
PARCO LUBRITE—Wear Resistant for Friction Surfaces

Benjamin S. Sampson

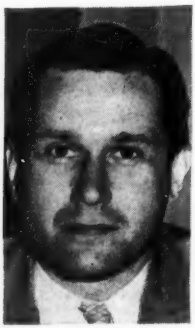
The appointment of **BENJAMIN S. SAMPSON** as manager of its Industrial Furnace & Oven Division, has been announced by the Claud S. Gordon Company, 3000 South Wallace Street, Chicago 16, Illinois.

This division will handle the Company's expanded national sales, engineering and service activities on industrial furnaces and ovens.

Mr. Sampson formerly was district sales manager of the Stewart Furnace Division of the Sunbeam Corporation.

WILLIAM H. CORWIN has just been appointed public relations director of Taylor Instrument Companies, Rochester, N. Y., according to an announcement made by Herbert J. Noble, executive vice president. Corwin joined the organization in 1942 as a member of the advertising department. Since 1943 he has edited the company's publication, "The Taylor Meteor," and prepared other company literature.

Promotion of **HOWARD B. DOWNS** to the post of general sales manager at Solventol Chemical Products has been announced by C. A. Campbell, president of the Detroit firm which manufactures synthetic organic cleaning compounds.



Howard B. Downs

Downs, who has served as advertising director of the firm for the past two years, joined Solventol in 1937 on the sales staff. In his new position, Downs will coordinate sales on Solventol in three major manufacturing areas: retail, bulk, and industrial. Major problem facing him is obtaining of new sales personnel and manufacturers' agents to keep pace with the rapid expansion of Solventol's facilities and markets.

W. H. MOFFATT has been appointed field representative for The Udylite Corporation in Rochester, New York, according to an announcement by L. V. Nagle, Udylite vice-president.

Mr. Moffatt joined the Udylite Corporation in 1941 as a member of the laboratory staff. After a period in the armed forces, he returned to Udylite in 1946 and was made technical service engineer for the state of Michigan. During the past year, he has represented Udylite as sales and service engineer for New York State.

W. H. Moffatt

A native Detroiter, Mr. Moffatt attended the University of Detroit, Ontario College of Pharmacy, University of Toronto, and the Detroit Institute of Technology.

HENRY D. FISCHER, JR., has been appointed sales manager of the Globrite Products Division of the Globe Chemical Co., Cincinnati, Ohio. A graduate of the University of Cincinnati, he has been associated with chemical cleaning and processing for a number of years.

EDWARD R. ANDERSON has been appointed vice president of the Kellogg Division of American Brake Shoe Company, according to an announcement by W. T. Kelly, Jr., division president. He is located in San Francisco, California.

Mr. Anderson first joined Brake Shoe in 1930 following his graduation from the Sheffield Scientific School, Yale University. He became district sales manager of the Pacific District for this Division in 1947. He will continue to serve in this capacity in addition to his new duties.

FLOCK

SHORT-CUT fibres of all types used to produce effects of suede, felt, velvet, mohair, velour, carpet on any surface in an economical manner.

LET our 25 years experience be your guide to quality results at lowest possible cost.

Rayon Processing Co. of R. I., Inc.

PIONEER PRODUCERS OF SURFACE COATING FLOCKS

65 MOSHASSUCK STREET • PAWTUCKET, R. I.

POLLAK PAINT CO.
715 Main St.
Buffalo, N. Y.

LAMBERT-NEW ENGLAND CO.
79 Sudbury St.
Boston, Mass.

H. R. MEININGER CO.
409 16th St.
Denver, Colo.

J. GORDON SMITH CO.
3901 Main St.
Dallas, Texas

Warren S. Master

WARREN S. MASTER has been appointed chief engineer of the Richardson-Allen Corporation, New York City. In his new capacity, he will have charge of all domestic and foreign technical operations of the company. For many years, Mr. Master has been engaged in consulting and development work in the utility, industrial and aviation fields. Prior to joining Richardson-Allen Corporation as rectifier engineer in 1947, he was chief engineer, Hudson Tool Company and rectifier development engineer, Federal Telephone and Radio Corporation. He is an E. E., a member of A.I.E.E., and holds numerous patents on selenium rectifiers and associated control circuits.

The Ceilcote Company, Rockefeller Building, Cleveland, Ohio, announces the appointment of **W. A. SEVERANCE** as chief chemist in charge of research and development, product control and special customer problems in the field of corrosion-proofing. Mr. Severance was formerly with the Parker Appliance Company, Cleveland, Ohio.

HUGO T. WILDER has been made manager of the marketing division of Aluminum Company of America's sales department, it was announced by D. Wilmot, ALCOA vice president in charge of product sales.

The marketing division is a new branch of the ALCOA sales organization. Among its main functions will be: the study of marketing methods and selection of sales outlet for products which, by their nature, reach the consumer through wholesale and retail channels; the conduct of market surveys; and supervision of sales statistics.

Mr. Wilder has been with ALCOA since 1919. He joined the sales department at the company's New York office in 1922, and became manager of the Newark, N. J., sales office in 1929. In 1944 he was made manager for ALCOA pig and ingot sales, with headquarters in Pittsburgh. In 1946, he assumed the additional duties of warehouse manager for the company, including supervision of ALCOA's nationwide distribution system.

MARTIN R. KING has been appointed manager of the General Electric Apparatus Department News Bureau, according to J. S. Smith, manager of the Advertising and Sales Promotion Divisions.

Mr. King, who has been assistant manager of the Apparatus News Bureau since March, succeeds **C. P. FISCHER, JR.**, who has been named manager of a new promotional division, activities of which will be announced later.

LEROY A. JOHNSON, who for the past 12 years has been a member of the Chicago Vitreous Enamel Product Company research division, has been made a service engineer, according to an announcement by A. S. Ault, manager of sales and service.

GEORGE E. GILLIAM will manage pyrometer supplies sales nationally for Brown Instruments division of Minneapolis-Honeywell Regulator Company, it was announced by William H. Steinkamp, Brown field sales manager.

Gilliam has been with the company for the past five years, most recently at its South Bend branch office. He will make his headquarters at the company home office in Philadelphia.

GENERAL BREHON SOMERVELL, president and a director of Koppers Company, Inc., Pittsburgh, was recently elected a member of the board of directors of The Carborundum Co., Niagara Falls, N. Y., according to an announcement by H. K. Clark, president.

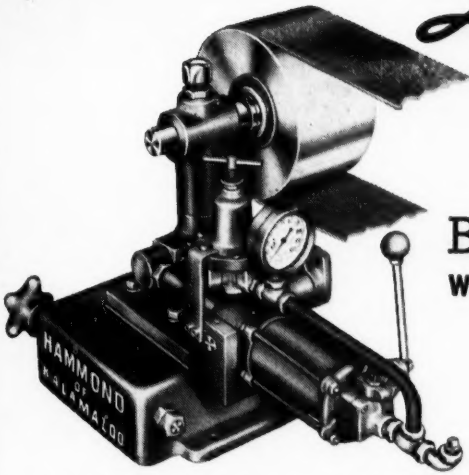
A graduate of the U. S. Military Academy, General Somervell served during both World Wars and retired from Army service in 1946. He is also a director of the Eastern Gas and Fuel Associates, Boston, Mass., Westinghouse Air Brake Company and the Union Switch and Signal Company, Pittsburgh, and the Montreal Coke and Manufacturing Company of Montreal, Canada.

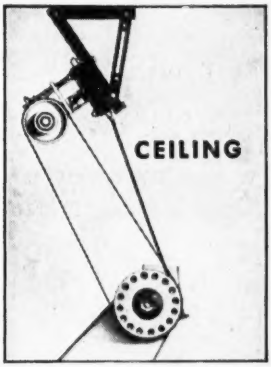
Hammond of KALAMAZOO

AIR

Bench Backstand

WITH AIR BELT TENSIONING



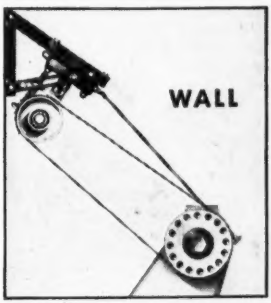


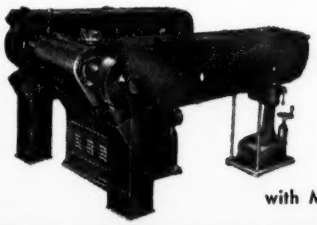
The Model 6-A Air Backstand SAVES ABRASIVE BELTS — INCREASES PRODUCTION — CONSERVES FLOOR SPACE.

An abrasive belt stretches as used. If correct tension is constantly maintained the belt will last longer and maximum production obtained.

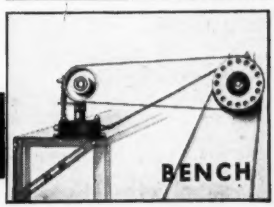
The Model 6-A Air Cylinder tensioning backstand maintains the correct tension throughout the abrasive belt life and automatically adjusts belt stretch to a fraction of an inch.

Write for catalog showing the Model 6-A and our complete line of 9 bench and floor-type backstands.





Another popular installation—Model VRO Variable speed (1500-3000 RPM) polishing lathe with Model 3-R Backstand.



Hammond Machinery Builders INC

1622 DOUGLAS AVE. • KALAMAZOO, MICHIGAN

GEORGE P. GABRIEL, who recently received a degree in Chemical Engineering at Penn State College, has accepted a position as engineer with The Atlas Mineral Products Company at Mertztown, Pennsylvania.

EDISON SICKMAN has been appointed district sales manager of the Middle Atlantic territory of the company.

HOWARD STERLING, a member of the supervisory staff, has been transferred to the sales department and will be located in the Southern California district.

HONORS

WILLIAM J. HARSHAW, president of The Harshaw Chemical Co., Cleveland, Ohio, has been awarded the honorary degree of Doctor of Science by Western Reserve University. The degree was given in recognition of his scientific discoveries in the fields of ceramics and electroplating.

MEETINGS

"Economy in Production" will be the central theme of the **31ST NATIONAL METAL CONGRESS AND EXPOSITION,** to be held in the Public Auditorium, Cleveland, Ohio, October 17 through 21, 1949.

This will be the first post-war program to concentrate attention on the greater efficiency of modern industrial equipment by actual demonstrations of what the equipment will do to effect savings and thus reduce the unit cost of the product or part it helps to make. Principles of cost cutting will be discussed in the technical and educational sessions of the Metal Congress; the "show-how" of production economy will be demonstrated by exhibitors featuring displays of equipment, materials, or processes in the Exposition.

Headlining the technical sessions will be a number of papers presented by eminent scientists in a Symposium on "Thermodynamics in Physical Metallurgy" to be held on Saturday and Sunday preceding the Exposition opening on Monday, October 17. Other subjects to be covered during the week include: "Alloy Steels," "Oxidation," "Quenching," High Temperature," "Transformations in Steels," "Temper Brittleness," "Stainless Steels," "Mechanical Metallurgy," "Nonferrous Metals," and "Atomic Energy Metallurgy."

The following technical societies are cooperating to insure the success of the Metal Congress: American Society for Metals; the American Welding Society; Metals Division, American Institute of Mining and Metallurgical Engineers; and the Society for Non-Destructive Testing. W. H. Eisenman, national secretary, American Society for Metals, is managing director of the Congress and Exposition.

The **FIRST INTERNATIONAL TECHNICAL CONGRESS** of the painting, construction, and associated industries, dedicated to the study of technical and economic problems of the profession, will be held at Paris, October 19 to 22, under the auspices of the National Union of Painters and Glaziers of France and the Associated Painting and Glazing Contractors of the City of Paris, with the cooperation of the magazine "Travaux de Peinture." In addition, a display of equipment necessary to this profession will be held October 17 to 22.

The Ninety-Sixth Convention of **THE ELECTROCHEMICAL SOCIETY** will be held at the La Salle Hotel, Chicago, Illinois, on October 12, 13, 14, and 15, 1949.

Symposia are being scheduled on Electrodeposition, Corrosion, and Organic Electrochemistry. Special round table sessions are being scheduled on Batteries and Organic Electrochemistry.

Additional information may be obtained by writing to Henry B. Linford, Secretary of The Electrochemical Society, 235 West 102nd Street, New York 25, N. Y.

A meeting of the **SOUTH CENTRAL REGION, NATIONAL ASSOCIATION OF CORROSION ENGINEERS** will be held at the Adolphus Hotel, Dallas, Texas, October 3 and 4, 1949.

In addition to two distinct sessions dealing with Aircraft Finishes and with New Methods for Testing Paints and Paint Materials, some of the other 15 sessions at the First Pacific Area National Meeting of the **AMERICAN SOCIETY FOR TESTING MATERIALS,** to be held in San Francisco, October 10-15, will be of interest to the paint fraternity. A session dealing with Application of Statistics is of general interest to all in the materials field.

719 PAINT FINISHERS ..... *Can't Be Wrong!*

THAT'S THE NUMBER OF PLANTS THAT USED *Materials* FROM INDUSTRIAL CHEMICAL PRODUCTS COMPANY LAST YEAR . . . *To Clean and Prepare Metals for Painting!*

TRY SOL-KLEAN

Removes Oil and Rust . . . And Anchors Paint To Metal . . . .

Over 3,000,000 gallons used in the last 10 years . . . Etches metal and coats with phosphate . . . Non-inflammable . . . Economical (dilute one volume of SOL-KLEAN with 3 volumes of water) . . . Apply by brush or dipping—wiped or washed off!

INDUSTRIAL CHEMICAL PRODUCTS COMPANY

3778 BELLEVUE AVENUE **DETROIT 7, MICH.**

Representatives In Principal Mid-Western Cities

In Canada made and sold by Boyle Chemicals Ltd., Windsor, Ont.

A.S.T.M. Committee D-1 on Paint, Varnish, Lacquer, and Related Products has aided in arranging the Paint Sessions and is sponsoring ten papers in the discussion on new methods.

During the week of the meeting, the Federation of Paint and Varnish Production Clubs is holding its West Coast Meeting in San Francisco, specific dates being October 14 and 15. The ASTM sessions are scheduled on Thursday, October 13, to dovetail with the Federation meeting.

TRAINING COURSES

A comprehensive 13-week course and two five-week courses have been scheduled for the period from August 15 to December 2 by the **BROWN TRAINING SCHOOL OF INDUSTRIAL INSTRUMENTATION,** Brown Instruments division of Minneapolis-Honeywell, Philadelphia.

As in the past the courses are designed primarily for customers, in order that they may obtain maximum benefit from their process control equipment, said M. J. Ladden, chief instructor.

The industrial instrument maintenance and repair courses will cover millivoltmeter type pyrometers, mechanical potentiometer pyrometers, continuous balance electronic type potentiometers, electrically operated automatic controls flow meters, thermometers, pressure gauges, hygrometers, air operated automatic control. Moist-o-Graphs, tachometers, resistance thermometers, CO_2 and analygraph.

The **FISCHER & PORTER COMPANY** announces a number of vacancies for its next instrumentation course to be held at the Hatboro, Penna., plant, October 10 through 14, 1449.

The course will cover manufacture, calibration, installation, operation and maintenance of the Company's complete line of "Flowrator" primary and secondary process control instruments. (Some time is also devoted to the basic principles of variable-area flow measurement.) It is designed for engineers responsible for process control instrumentation and for instrument specifications, installation, operation and maintenance.

THE OHIO MECHANICS INSTITUTE, Central Parkway and Walnut St., Cincinnati, Ohio, is offering an evening course in electroplating. Subjects to be considered in the course include: principles of electroplating, cleaning methods, copper, nickel, chromium, cadmium, tin, zinc and silver plating, anodizing, and electropolishing. Each solution studied will be discussed in the classroom and methods of analysis and control will be considered in the laboratory.

Intensive training at the **DeVILBISS SPRAY PAINTING SCHOOL** in Toledo, Ohio, is available without charge to finishers operating DeVilbiss spray equipment.

Courses of one week duration will begin on the following dates: September 26, October 31, November 28, and December 19. Lectures, demonstrations and actual practice will be devoted to latest methods and techniques of spray application.

All interested persons should write well in advance for registration.

THE DEPARTMENT OF CHEMICAL ENGINEERING, NEW YORK UNIVERSITY, is offering a series a graduate courses in Surface Technology, under the direction of Professor Kronstein. These courses include: Surface Finishes (study of the principles involved in protective, decorative, and functional finishing); Surfaces Finishes Laboratory; and Research (properly qualified students may pursue experimental studies in connection with the preparation of theses).

NECROLOGY

EDWARD J. BURNELL, vice-president, general sales manager, and director of Link-Belt Company, died at his home in Winnetka, Ill., on Friday, July 22, after an illness of several months.

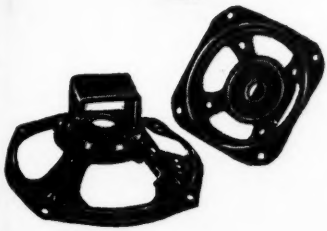
Mr. Burnell was born in Tondu, Wales, Great Britain, April 7, 1888. He came to this country with his family and lived in Catasauqua, Pa. He was graduated from Lehigh University in 1910.

Mr. Burnell served Link-Belt Company in many important capacities, in engineering, sales and plant management.

During the war he served on the advisory boards of Machinery Branch of War Production Board and the Chemical Corps of the War Department, and as consultant to the Reconstruction Finance Corporation.

REDUCE YOUR METAL FINISHING AND HEAT TREATING COSTS

... WRITE ..... WIRE ..... PHONE ...



Your metal finishing and heat treating costs *must* decrease if you take advantage of our quality products and highly specialized engineering skill. Write, wire or phone Bridgeport 7-1390 or 7-1194 and one of our engineers will survey your requirements.

BLACK MAGIC

ONE-BATH METAL FINISH

BLACK-MAGIC, a simple, inexpensive, one-bath black oxidizing process for steel, is way out in front because of highest quality materials, engineering skill, and prompt, efficient service. We have products and processes for coloring steel, iron, brass, copper, zinc and cadmium, metal cleaners, rustproof coatings and dips and metal treating salts.

Quick-Carb carburizing salts, Quick Temper tempering salts and Neutral salts perform fast and efficiently over all required temperature ranges.

MITCHELL-BRADFORD CHEMICAL COMPANY

MODERN METAL FINISHES

2446D MAIN ST., STRATFORD, CONN.

BLACK-MAGIC OXIDE BLACKING SALTS
WITCH-DIP & WITCH-OIL FINAL FINISHES

SILCO *Glass-Base* PROTECTIVE COATING
HEAT TREATING SALTS, CLEANERS, ETC.

P. E. I.

11th ANNUAL FORUM

THE OHIO STATE UNIVERSITY
COLUMBUS, OHIO
SEPTEMBER 14, 15, 16, 1949

THE Forum is an industry educational service sponsored by the Porcelain Enamel Institute and dedicated to improving the materials, processes and controls involved in porcelain enameling manufacturing. It is designed to disseminate information that will contribute to higher product quality, increased operating efficiency and to wider markets for all porcelain enamel products.

Program

WEDNESDAY, SEPTEMBER 14, 1949

Morning Session

9:00 A.M.—Registration—Social Administration Building

10:30 A.M.—Meeting of Committees

Afternoon Session

Presiding—Prof. R. M. King, Dept. of Ceramic Engineering, The Ohio State University

1:30 P.M.—Address of Welcome

DEAN CHARLES E. MacQUIGG, The Ohio State University

Response

C. D. CLAWSON, President, Ferro Enamel Corp.; President, Porcelain Enamel Institute

2:00 P.M.—Low Temperature Enamel Firing

P. M. WHEELER, Chicago Vitreous Enamel Products Co.

Low Temperature Enamel Furnaces

SLADE GAMBLE, Lindberg Engineering Co.

Avoiding Enamel Defects Through Proper Operation of Furnaces

M. J. BOZSIN, Ferro Enamel Corp.

Grit Blasting Sheet Steel Parts for Porcelain Enameling

A. E. RAEUBER and E. C. PLOETZ, A. O. Smith Corp.

THURSDAY, SEPTEMBER 15, 1949

Morning Session

Presiding—W. H. Pfeiffer, Frigidaire Division, General Motors Corp.

9:30 A.M.—The Evolution of Deep Drawing Lubricants for the Porcelain Enameling Industry

G. A. CAIRNS, Macco Products Co.

Emulsion and Alkaline Cleaners

A. J. HOLLOWAY, Geo. D. Roper Corp.

Maintenance and Operation of Spray Pickle Equipment

H. C. ELLINGER, Philco Corp.

Low Pressure Air Atomization for Spray Guns

MARCEL POUILLY, DeVilbiss Co.

Automatic Spraying of Porcelain Enamel

D. J. POLLINGUE, JR. and JOHN B. VERNETTI, Lustron Corp.

Afternoon Session

Presiding—Edward Mackasek, Managing Director, Porcelain Enamel Institute

1:30 P.M.—Effect of Mill Additions on Properties of Titanium Enamel Cover Coats

DR. E. E. MARBAKER, The O. Hommel Co.

Discussion of Control Methods; What Equipment Is Being Used; How Tests Are Being Made

GEORGE R. MARTIN, Pemco Corp.

Comparison of Porcelain Enamel with Organic Coatings

DR. G. H. SPENCER-STRONG, Pemco Corp.

Influence of Training on Perception

DR. SAMUEL RENSHAW, Professor of Psychology, The Ohio State University

6:30 P.M.—Annual Forum Banquet, Deshler-Wallick Hotel

Presiding—Dr. G. H. McIntyre, Ferro Enamel Corp.

How We Can Build Good Public Relations for Our Company and Its Products

F. F. GREGORY, Director of Public Relations, A. O. Smith Corp.

FRIDAY, SEPTEMBER 16, 1949

Morning Session

Presiding—Dr. G. H. McIntyre, Vice President and Director of Research, Ferro Enamel Corp.

BOARD OF EXPERTS

B. D. BRUCE
Chicago Vitreous Enamel Product Co.

M. J. BOZSIN
Ferro Enamel Corp.

LEROY CAMEL
Detrex Corp.

S. DAVIS
The O. Hommel Co.

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E. E. HOWE
Lustron Corp.

F. A. PETERSEN
University of Illinois

W. H. PFEIFFER
Frigidaire Division, General Motors Corp.

F. R. PORTER
Inland Steel Co.

M. POUILLY
DeVilbiss Co.

G. N. TUTTLE
Benjamin Electric and Mfg. Co.

J. C. SWARTZ
Westinghouse Electric Corp.

J. B. WILLIS
Pemco Corp.

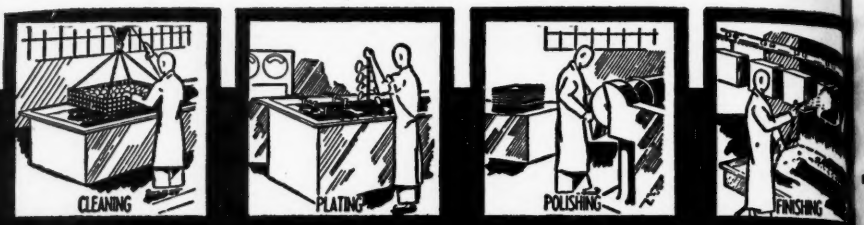
Afternoon Session

Presiding—E. E. Howe, Manager, Ceramic Division, Lustron Corp.

Forum Will Convene at Lustron Plant; Description of Enameling Operations.

Trip Through Lustron Plant. This is the world's largest and most modern enameling plant. In it is incorporated the latest developments in engineering, equipment and processing.

Adjournment.

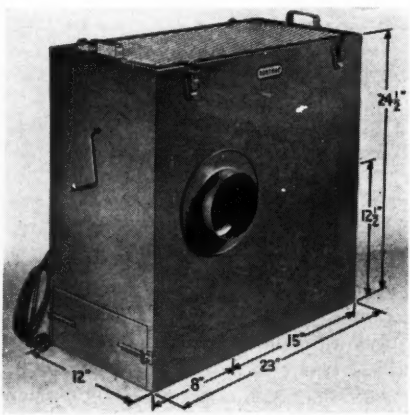


New • EQUIPMENT • MATERIALS • PROCESSES

Improved Dust Collector

Improvements in the "Dustkop" Model 420 Dust Collector to permit its use in polishing, buffing, and grinding operations involving larger wheels and greater volumes of dust are announced by the Aget-Detroit Co., Main at Washington Sts., Ann Abor, Mich. The changes, however, do not involve any increase in floor space requirements or in overall height.

New ratings are provided due to the combined used of a ½ h.p. motor direct driving a new special hi-static paddle-wheel fan. The standard built-in cyclone separator and the second-stage filter of spun glass which subjects the air to a final cleaning before being returned to the working area are both continued.



"Dustkop" Improved Model 420 Dust Collector

Tru-Steel Shot

American Wheelabrator & Equipment Corporation, Mishawaka, Ind., has announced the development of Tru-Steel Shot for use in all types of blast cleaning equipment. This new material is a genuine true steel that has received a full heat treatment and exhibits that combination of hardness and toughness generally associated with steel.

Tru-Steel Shot is now available for immediate delivery in all sizes for use in descaling, cleaning, and shot peening operations.

Permabrasive

A special treatment of the carbon to provide a softer, more malleable body is the feature of a new shot and grit now offered for metal cleaning. Under the trade name of Permabrasive, the new product is announced by Hickman, Williams and Co., exclusive sales agents for the National Metal Abrasive Co., Cleveland, Ohio. Because of its softer body, the new shot and grit retains its original impact value longer, extends its useful life before final breakdown and causes less abrasion on machines and parts, it is claimed.

Manufactured in both Cleveland and Chicago, the new abrasive is available for immediate shipment.

Metal Finishing Supplies

RAKES . . . SPINNERS . . . TUBE POLISHING MACHINES

This Modern Wheel Rake Is Economical! It Saves Buffs

You'll find this modern wheel rake safe, fast and economical. It will recondition and shape polishing wheels and buffs with a minimum loss of material and without hazard. Write for complete details and prices.

Tube Polishing Machines Improve Workmanship

Rubber rolls tapered against each other drive tubing across face of polishing wheel or abrasive belt. Tube machine produces a uniform finish, free from spiraling. It polishes tubes from ¾" to 5" in diameter.

Work Holding Spinners For Uniform High Speed Polishing and Buffing

Here's a spinner for holding work and producing uniform high speed polishing and buffing. It has totally enclosed grease packed ball bearing construction. Removable fixture flange has machined face and screw holes for attaching wood block or other fixtures. Write for complete literature and price quotation.

Selective Distributorships Available

The **Manderscheid** COMPANY

810 FULTON STREET
CHICAGO 7, ILLINOIS

BACKSTAND IDLERS • CONTACT WHEELS • TUBE POLISHING MACHINE • SPINNERS • BUFFING WHEEL RAKES • POLISHING WHEEL BUSHINGS • POLISHING LATHE WRENCHES, FLANGES, COLLARS & NUTS • SCREW POINTS • EMERY TROUGHS • BALANCE WEIGHTS & WAYS • TUBE SUPPORT STAND •

• METAL FINISHING SUPPLIES AND EQUIPMENT •

"Fastuff"

A synthetic finishing material, designated as "Fastuff," that air dries and sets to a tough, flexible, tack-free film with the speed of a lacquer has been developed by United Lacquer Mfg. Corp., Linden, New Jersey.

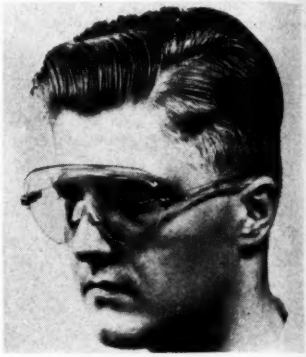
This same material can be air dried or baked in a few minutes at 250 or 300 deg. F. and is not affected appreciably by over-baking, it is claimed. Fastuff has superior color and gloss retention in high humidity or when subjected to steam vapors, and it has excellent resistance to kitchen fats, grease, or vinegar, the manufacturer states.

Fastuff provides flexibility plus a hard surface, and the film polishes beautifully either by machine or by hand, it is stated.

When air dried, Fastuff usually can be handled and stacked within 15 minutes and packed in three or four hours. It is available in white, black and all other colors for wood, steel, aluminum, and brass.

Safety Spec

A new safety spectacle has been developed by United States Safety Service Co., Dept. PF, Kansas City 6, Mo., under



Saf-I-Spec in use

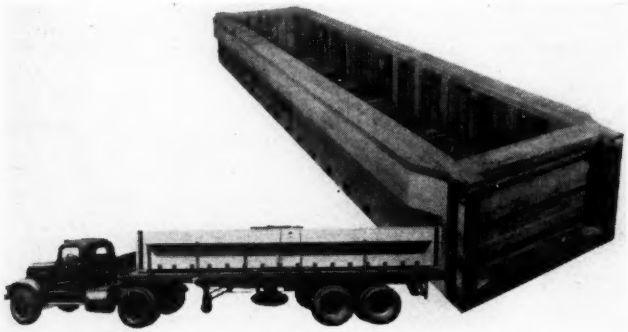
the trade name "Saf-I-Spec" and it has several outstanding features. One of them is the one piece lens which can be replaced or adjusted instantly. Patented, quick detachable temples may be instantly attached to the outside edge of the lens, making it possible for the wearer to adjust the temples to the position desired to make them fit correctly and to be comfortable. The lens has an integral molded sweat-bar and patented design which provides unusual rigidity and still prevents misalignment. This safety spec can also be adjusted for wear over personal glasses.

The one piece lens is made from "Optilite," a new optical safety plastic which meets strict government specifications for impact and piercing resistance. The lenses are optically correct and are available in crystal clear or anti-glare green. The detachable temples are permanent

Wood Pickling Tank

Cleaning and pickling of long lengths of metal tubes rolled from flat strip and electrically welded may be accomplished in a large wood tank available from Wendnagel & Co. Inc., 600 W. Cermak Rd., Chicago 16, Ill. Tubing in lengths up to 22 feet may be lowered into the tank at an angle and cleaned and pickled by the action of the chemical solution assisted by air or steam forced through the tubing.

Advantages of using a wood tank for this operation include resistance of wood to the action of various acids and other chemicals, and long life.



Wood tank 26 feet long, 4½ feet wide, 27 inches deep used for cleaning and pickling metal tubing

START with a K-P Belt for a FAST FINISH

Korb-Pettit Spiral Woven Wire Conveyor Belts are fabricated in suitable metals and mesh sizes for baking, conditioning, heat treating, material-handling, processing and washing. Particularly well adapted to conditions where drainage and the free circulation of air are required. K-P Flextrough Belts with flanged edges prevent the escape of small parts. Side chains can be provided for sprocket drive.

K-P Spiral Woven Wire Conveyor Belts increase production and sting the maintenance bill at the same time because they are backed by superior engineering skill and the accumulated experience of many years.

Consult with the K-P district sales office or write direct. Korb-Pettit Wire Fabrics and Iron Works Inc., 1509 North Mascher Street, Philadelphia 22, Pa.

•

Korb-Pettit Spiral Woven Wire Conveyor Belts

"Keeps Promises"

Wire mesh, Spiral Woven Wire Conveyor Belts, Infra-Red Conveyor Dryers, Leather Finishing and Drying Machines, Complete Special Purpose Conveyors designed and Manufactured to Order.

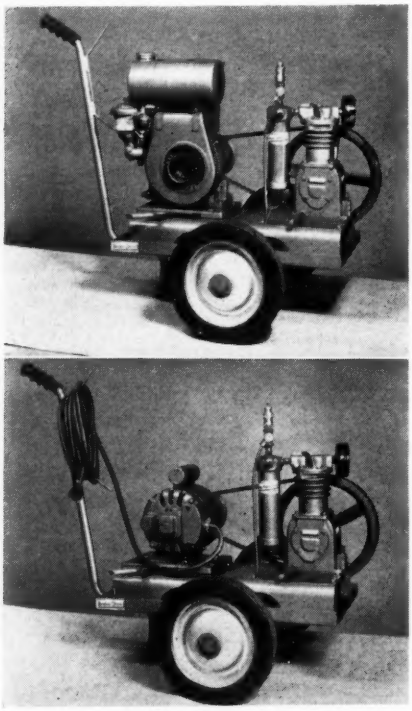
equipment and can be re-fitted over and over again to replacement lenses. The "Saf-I-Spec" is extremely light in weight and comfortable to wear, the manufacturer claims. It is manufactured by the United States Safety Service Company, Kansas City 6, Missouri.

Portable Air Compressors

Two dual-pressure low-cost portable air compressors have been announced by American Brake Shoe Company's Kellogg Division, 230 Park Ave., New York 17, N. Y. Both piston-type compressors offer two working pressures and two air deliveries by merely shifting a lever.

Model B-140-DS (shown with cord) is powered with a ½ h.p. electric motor. Model G-140-DS is powered with a ¾ h.p gasoline engine. Both models operate at 150 pounds pressure delivering 2.4 c.f.m. free air. By shifting a lever, the compressor is a continuous-running unit at 50 pounds pressure delivering 3.2 c.f.m. free air.

Both models are said to be particularly adaptable where quick, dependable quality performance is needed at low cost. Both are easily portable with or without a cart.



Model G-140-DS portable air compressor (top); Model B-140-DS (bottom)

Cyclon Series "WPS"

Munray Products, Inc., 12400 Crossburn Ave., Cleveland 11, Ohio, sales division of the Poly-Cyclo Products Co., has announced a new selective coating system, Cyclon Series "WPS," for the protection of all types of metals that are projected to extreme corrosive conditions, particularly, where direct immersion in the corrosive medium is a necessary applicational factor.

Essentially formulated from basic vinyl plastic resins and, consequently, unaffected by acids, alkalies, their salts, petroleum products, alcohols, water and many other reagants this new Cyclon Coating is said to adhere tenaciously to all types of metallic surfaces. Sandblasting and other similar cleaning processes are generally not at all necessary.

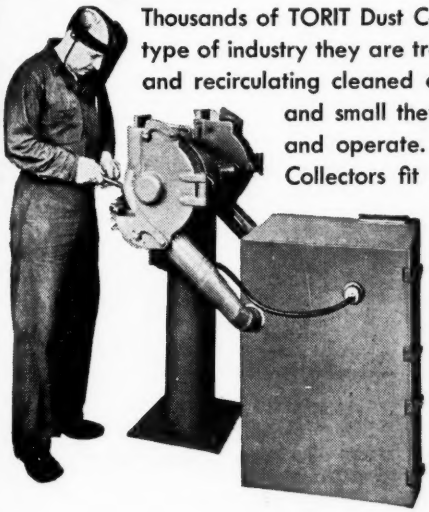
Adhesion is secured by chemical inner-reaction of the Cyclon "WPS" primer with the metal surface which unites the two integrally. The bond, therefore, is accomplished chemically and is not dependent upon mechanically roughening of metal surfaces. The Cyclon Primer's resin impregnated, corrosion inhibiting pigments also develop a tough, impermeable film completely preventing underfilm metal deterioration. The bond strength is claimed to be excellent even with such difficult materials as zinc, lead, cadmium, aluminum, nickel, copper, stainless steel, galvanized metals, and magnesium.

Completing the Cyclon selective coating system a Tie Coat and a final Top Coat of the "WPS" formulations are used. Just as its name implies the Cyclon Tie Coat has been specifically formulated to unite the "WPS" Primer with the Top Coating.

Cyclon "WPS" Top Coat is applied as the final sealing, anti-corrosion protective coating. Coupled with its unique resistivity to chemical attack are all the recognized advantages desired in a metal coating—adhesion; flexibility over a wide temperature range; impermeability; continuity; excellent dielectric properties; toughness and permanency.

You can grind out production records when you eliminate the dust menace with

TORIT DUST COLLECTORS



Thousands of TORIT Dust Collectors are now in use. In every type of industry they are trapping abrasive dust at its source and recirculating cleaned air into the room. In large plants and small they are proving economical to own and operate. Compactly designed TORIT Dust Collectors fit all production layouts. They are now being produced in quantity, and sizes and capacities to fit all standard grinding, polishing and cut-off machines are available for immediate delivery. For complete information and latest TORIT catalog write:

TORIT Manufacturing Co.
314 Walnut St. • St. Paul 2, Minn.

Lea Lectromag

The Lea Mfg. Co., Waterbury, Conn., manufacturer of polishing, buffing and burring compounds and other finishing supplies, has announced the Lea Lectromag (Lipson Patent Pending), an instrument for measuring the thickness of nonmagnetic coatings on carbon steel or iron.

Lea Lectromag

The Lea Lectromag is a simple, durable, instrument designed to measure coatings from 0.0002 to 0.008 inch with a plus or minus 10 per cent accuracy for thicknesses of 0.001 inch and over and a plus or minus 15 per cent accuracy for thicknesses under 0.001 inch. Its small size, compactness and portability make it very useful in plants where articles to be checked are usually carried to the laboratory. With this instrument, thickness measurements can be made right on the spot.

To make a thickness measurement, plug the leads into a source of 110 volts (variation of plus or minus 8 volts does not affect accuracy), 60 cycle power. Hold the instrument vertically over the piece to be tested, allowing the glass tube with its core to rest on the surface. Then raise the solenoid (casting) slowly, holding the glass tube in contact with the surface. Watch for a warning signal—or chattering noise—which occurs just before the core breaks its contact with the surface. At the moment the core breaks the contact, stop raising the solenoid. Still holding the glass rod on the surface to steady the instrument, allow the core to come to rest and then take the reading. It is suggested that several readings be made and the average taken. A calibrated scale comes with the set, translating readings directly into coating thicknesses.

Titanium Dioxide

Several improved types of titanium dioxide are now being manufactured and are standardized for distribution by the American Cyanamid Company, Calco Chemical Division, Bound Brook, N. J. The improvements are a result of considerable development work and the introduction of new processing equipment.

Unitane 0-310 (Anatase type) is particularly suited for high temperature baking enamels, refrigerator finishes, lacquers and phenolic resin enamels. It is recommended also for use in architectural finishes and industrial finishes where the extraordinarily high hiding of Rutile is not required and where the clear bluish tone of Anatase is preferred for its decorative effect. It is characterized by low reactivity with most vehicles and produces finishes of excellent gloss and gloss retention.

Unitane OR-342 is a new type of Rutile titanium dioxide developed especially for use in enamel finishes and related products. It is particularly adapted to formulae including more reactive vehicles such as the Maelic modified types and certain highly bodied oleoresinous varnishes.

Unitane OR-342 performs especially well in metal decorative roller coatings where very thin films are laid down and must have the maximum flow to give satisfactory coverage and uniformity. It is excellent for use in alkyd baking enamels where it maintains high gloss and good color retention under aging conditions.

Type DA, DB, and DC Air Guns

Newly designed air guns now in production by Paasche Airbrush Co., Dept. 38, 1909 Diversey Parkway, Chicago 14, Illi-

For a real good polishing job use

Keystone TURKISH Emery

FRESH SUPPLY AVAILABLE

KEYSTONE EMERY MILLS *Write for Sample* **4316 Paul St., Phila., Pa.**

IF THERE ARE "BUGS" IN YOUR CLEANING OPERATIONS

BECAUSE OF—

- Hard to Remove Buffing and Polishing Residues
- Drawing and Stamping Compounds
- Slushing Oils
- Stubborn Solid Dirt Particles
- Alkaline Damage

Try A PRECLEANING DIP IN Magnusol

OFTEN a 30-second precleaning dip in Magnusol makes all the difference between a good and a bad plating job. All solid dirt and most stubborn residues will vanish in the water rinse after the dip.

If you're cleaning before plating, final alkaline cleaning to give you a chemically clean surface will be faster and better, when dirts that resist alkaline cleaning are first removed in Magnusol.

If you're cleaning for painting, lacquering and most other finishing operations, the Magnusol dip is usually all you need to get a satisfactory surface for your finish.

Magnusol precleaning is economical as well as simple. Work is dipped in or sprayed with the solution, then rinsed clean—with a water spray. No heat is required.

Magnusol is supplied as a concentrate to be used with kerosene or safety solvent in the proportion of one part to six or eight parts of the diluent. It is safe for all metals, and is non-toxic and non-inflammable.

Ask us to arrange for a demonstration of what Magnusol can do for your work, *right in your own plant.*

MAGNUS CHEMICAL COMPANY • 208 South Ave., Garwood, N. J.

In Canada—Magnus Chemicals, Ltd., 4040 Rue Masson, Montreal 36, Que.

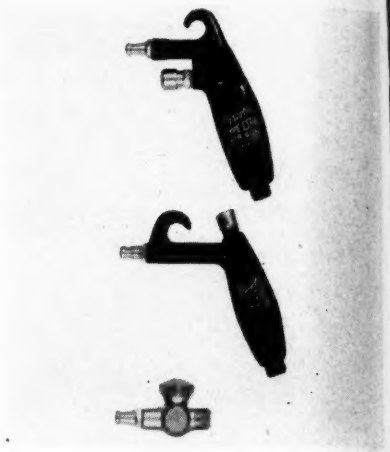
Service representatives in principal cities

nois, have been streamlined to provide a faster operating air tool.

The principal innovation in design has been the styling of the gun handle so as to fit more easily and quickly into the hand of the operator. Another action-assisting feature is the suspension hook which is so designed that it may be quickly hung up on a suitable fixture after each blow-off operation and retrieved in the least possible time for the next blow-off.

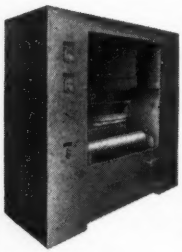
Paasche engineers have also kept in mind the fact that the average air gun gets considerable banging about in use. It must be able to stand frequent and sometimes rather heavy impacts without damaging the valve mechanism. The new Paasche air guns are said to have a positive air shut off which retains its effectiveness for longer periods under heavy use than previous guns.

The featured gun in the new line is the Type DA pistol grip style with the trigger valve in the normal trigger position. Type DB, slightly smaller and lighter, is designed as an efficient air gun at a somewhat lower price. Trigger on the DB is located above the handle and is operated by thumb pressure. Both the DA and the DB have standard male thread ¼ inch pipe connections. Strainer screen in the handle prevents nozzle clogging.



Type DA, DB, and DC Air Guns

In addition to these two guns, the new Paasche line includes the Type DC, for use where a constant flow of air is desirable without the need of holding down the trigger button. Needle valve adjusts for any volume of air from zero c.f.m. to maximum capacity of the nozzle. It is ideal for mounting on a machine to provide a continuous stream for blow-off or cooling during machine operation.



•MORE PRODUCTION
•LOWER UPKEEP
•BETTER RESULTS
•EASIER HANDLING
•SAFER OPERATION
•LESS DIRT

This revolutionary, all-hydraulic PORTER-McLEOD mirror finishing and glazing machine is available in two sizes; one to polish flat items (skates, saw frames, scissors, wrenches, putty knives, knife blades, etc.) up to 8" long; the other for flat pieces up to 14".

Write for complete information

PORTER-McLEOD Machine Tool Company

50 PROSPECT ST. HATFIELD, MASS.

Series 500 Absolute Pressure Gage

The Bristol Company, 108 Bristol Rd., Waterbury 91, Conn., has announced the development of a mechanical-type recording absolute pressure gage based on an entirely new principle, involving a pressure-sealed lever arm so constructed that it is frictionless, entirely free from lost motion, and free of turning moments due to changes in differential pressure across it. This design makes possible the recording of extremely low absolute pressure ranges.

Known as the Series 500 Recording Absolute Pressure Gage, the new instrument is offered in ranges from 0 to 200 millimeters mercury up. Several instruments with the extremely low range of 0 to 6 millimeters mercury absolute pressure have been successfully used.

The instrument is rugged in construction and can be used under ordinary plant

ROTARY AUTOMATICS • SEMI-AUTOMATICS • STRAIGHT LINE AUTOMATICS

• FOR HIGH PRODUCTION POLISHING AND BUFFING •

ROTARY AUTOMATICS • SEMI-AUTOMATICS • STRAIGHT LINE AUTOMATICS

ACME CONTINUOUS ROTARY Automatics

Put Polishing and Buffing Operations on a Production Basis!

At left above: ACME 6-ft. Continuous Rotary having 50 continuous revolving chuck spindles —1 polishing head and 5 buffing heads. Used for finishing octagon plumbing goods escutcheons.

At left: ACME 10-ft. Continuous Rotary having 96 continuous revolving spindles. Used with 2 ACME Type G-3 Universal polishing belt heads with floating back up wheel and 8 ACME Type G-3 buffing lathes. Used for polishing and buffing brass door knobs.

ACME Continuous Rotaries are built in various table sizes from 20 inches to 10 feet or more in diameter. They are adaptable to a great many arrangements that keep finishing costs down on polishing and buffing operations.

ACME builds Straight Line and Rotary Automatics, Semi-Automatic and Special machines to handle virtually any type or size of polishing and buffing operation on a production basis. Acme Automatics cut finishing costs and get more output per man-hour. Payroll dollars buy more production when ACME machines are used!

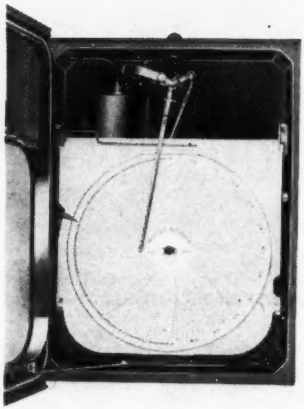
Visit our Booth No. 826, October 17-21, National Metal Exposition, Cleveland, Ohio

SPECIAL MACHINERY AMC AUTOMATIC BUFFING MACHINES

ACME Manufacturing Co.

1645 HOWARD ST. DETROIT 16, MICH.

Builders OF AUTOMATIC POLISHING AND BUFFING MACHINES FOR OVER 35 YEARS



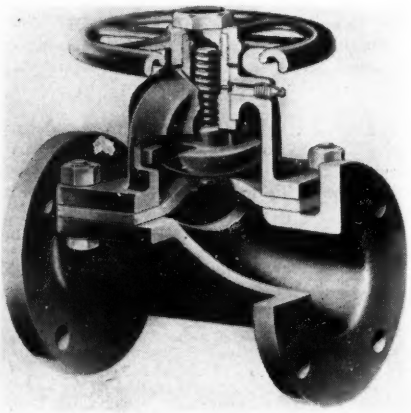
Series 500 Absolute Pressure Gage

conditions. It gives an accurate record of vacuum in terms of absolute pressure, correct for barometric variations.

The new instrument is offered as a recorder, as an automatic controller, and for remote measurement and automatic control of absolute pressure.

Valve for Corrosive Service

The development of a new plastic diaphragm for use in Hills-McCanna Saunders Patent Diaphragm valves has been announced by the Hills-McCanna Company, 3025 N. Western Ave., Chicago 18, Ill. The manufacturer claims that the new material makes possible the handling of 66 deg. Baume sulphuric acid without leakage, dripping or sticking problems.

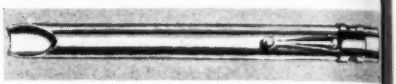


Hills-McCanna Saunders Patent Valve

At the present time it is the plan of the company to furnish these valves in sizes from ½ inch through 4 inches, with a choice of cast iron, cast steel, Durimet or glass lined bodies. All but the glass lined will be available with flanged or screwed end; the glass lined will be available only with flanged ends. All sizes are suitable for pressure to 100 p.s.i. and temperature to 125 deg. Fahrenheit.

Pocket Microscope

A pocket microscope supplied in 20 and 40 power, has been announced by Du-Maurier Company of Elmira, N. Y.



Pocket Microscope

Scarcely larger in diameter than a pencil, the microscope is equipped with 4 lenses mounted in a satin finish aluminum tube and may be used for inspecting small objects or surfaces.

Diaphragm Relief Valve

For use in lines handling air, cold water, oil, and similar liquids at pressures up to 250 p.s.i., the C. A. Norgren Co., 222 Santa Fe Dr., Denver 9, Colo., is offering a diaphragm relief valve designated as the Series 62-A. When the pressure exceeds the relief setting, the diaphragm and valve seat are raised, opening the valve and releasing the air or liquid through the outlet port.

All parts in contact with the air or fluid handled are brass. The synthetic rubber diaphragm, reinforced with nylon cloth, is said to be highly resistant to oil and other fluids for which the valve is recommended. The diaphragm extends to the extreme outer edges of the body and bonnet.

The valve is offered in pipe sizes of ¼

OBTAIN BETTER RESULTS!
USE
BUNATOL

In the field of rack insulation BUNATOL No. 1000 Paste has proven itself to be the quality insulation at the lowest price.

This free flowing 100% solids Paste is so simple to handle that the costly problem of rack insulation is quickly solved. If you have an oven to bake racks, Paste insulation can actually be used at less cost, and with remarkable long insulation life.

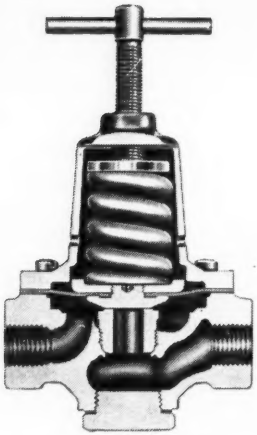
No. 1000 Paste cures to form an extra tough thick coating that will withstand all plating solutions and will not cut or abrade from rough handling. The insulation will last for months instead of weeks. It's permanently flexible and will not crack or peel on spring contacts.

Price is an object! First cost is much less and only a single Primer and a single top coat gives this remarkable result. It's the reason so many shops are turning to BUNATOL No. 1000. Less investment; less cost; so easy to use; racks completely insulated in a few hours.

Let us prove these points. Write for complete information and sample.

NELSON J. QUINN CO. • TOLEDO 7, OHIO

BUNATOL



Norgren Series 62-A Diaphragm Relief Valve

¼, ⅜, ½, ¾, and 1 inch and is available with any of 6 sizes of regulating springs for relief pressure ranges of 2 to 15, 15 to 50, 40 to 75, 75 to 125, 125 to 250, and 5 to 125 pounds per square inch.

Stanzoil NL-52 Heavy Duplex Glove

Featuring heavy weight, extra large size, and extra length, the Stanzoil NL-52 Heavy Duplex Industrial Glove is being produced by The Pioneer Rubber Co., 1939 Tiffin Rd., Willard, Ohio. The glove is made of elastic, knit-lined Neoprene, is 14 inches long, and is furnished in sizes 10 and 11. The fingers are straight and coated with the Pioneer non-slip finish.

TEST YOUR PRODUCTS ! !

Testing Equipment for Organic Coatings

ASTM Viscosity Cups, Conical Mandrel ASTM D522-41, Abrasiometer ASTM D658-44, Scratch Adhesion & Mar Tester (Laboratory & Pocket type) Automatic Spraying Machine D825-45T, Bell Tele Lab. Impact Tester, Dust Free Tester (drying time).

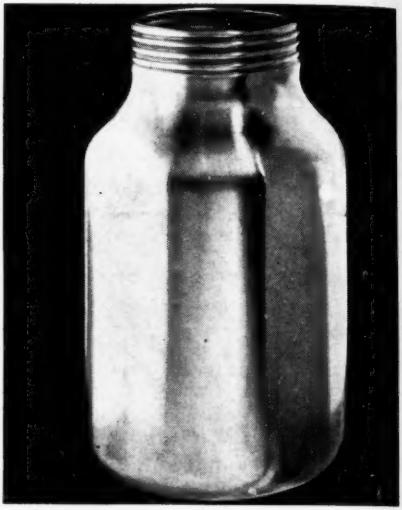
Write for illustrated literature.

HENRY ZUHR, INC.

187 Lafayette St., N.Y.C., 13

N5400 Flock Container

A new, lightweight 2-quart aluminum container for use with the Black Arrow flock gun—the "Fibr-Gun"—has been announced by The Black Manufacturing Co., Parkton, Md. Advantages of the new container over the glass container are described as: absolute protection against explosion, great decrease in weight, and elimination of breakage from dropping.



N5400 Flock Container

The new container, N5400, will fit all Black Arrow Fibr-Guns that are now in use.

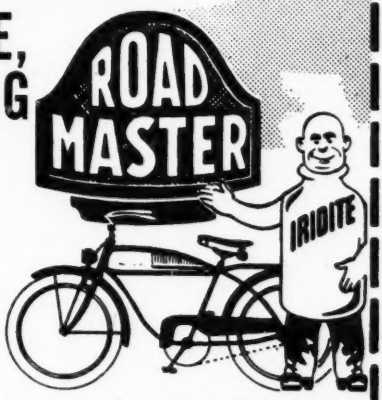
PRODUCT LITERATURE

Traveling-Oven Recording Thermometer Bulletin. A new bulletin on the company's Traveling-Oven Recording Thermometer has just been published by The Bristol Company, 108 Bristol Rd., Waterbury 91, Conn. The bulletin describes the use of the instrument with various types of conveyor ovens to record finishing, lacquering, japanning, drying and baking temperatures. Illustrated with photographs and reproductions of typical chart records, the new bulletin, No. T842, also contains complete specifications and prices.

IRIDITE

keeps zinc plate

STAIN FREE, SPARKLING BRIGHT on



Because it *economically* gives lasting, chrome-like brightness to zinc or cadmium plate, Iridite Bright is the final finish on hardware for The Cleveland Welding Company's famous Roadmaster Bicycle.

Shop-wise, Iridite Bright offers many advantages: a simple chemical dip, ease and speed of operation, non-electrolytic, requires only usual plating shop equipment and operators. And you get uniform consistent results from manual or automatic handling.

Other Iridites provide amazing corrosion resistant finishes and excellent paint adherence for all zinc and cadmium surfaces—die-cast, galvanized or plated.

Does this give you any ideas for your own products? Then write today for descriptive folder and samples. Or, better still, send your product samples for *free processing*.

ALLIED RESEARCH PRODUCTS, INC.

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BALTIMORE 5, MD.

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Washing Machine Parts
Radio Equipment
Kitchen Utensils
Aircraft Parts
Lock Hardware
Office Machines
Window Frames
Vending Machines
Wire Cloth
Tools
Lamp Fixtures
Fuel Pumps
Carburetors
Auto Hardware
Zinc Coated Sheet
Hinges, Screws, Bolts
Camera Parts
Plumbing Fixtures
Wall Panels
Refrigerator Parts
Wire Products
Instrument Parts
Electrical Equipment

West Coast Licensee—L. H. Butcher Co., Los Angeles 23, California

Durimet 20 Sheet and Plate is the subject of Bulletin 502, available from The Duriron Co., Inc., Dayton 1, Ohio. The catalog describes properties of Durimet 20 and lists corrosives to which Durimet 20 is resistant. The catalog also includes photographs of some typical installations.

"Nu-Chromseal Tape and Compounds" is the title of a folder available from Pittsburgh Plate Glass Company, Grant Building, Pittsburgh 19, Pennsylvania. The folder describes the application of Nu-Chromseal Tape and Compound for sealing lap joints or butt seams in metal, wood or fiber, where rivets, bolts, or screws are the connecting media. The tape will also seal against gasoline, oil and water transmission.

Bulletin No. 2451-C. Illinois Testing Laboratories, Inc., 420 N. LaSalle St., Chicago 10, Ill., has prepared a new 8-page information bulletin—No. 2451-C—on its Alnor Distant Reading Electric Thermometers. Abundantly illustrated, the bulletin shows how to obtain accurate temperature readings between minus 100 deg. F. and plus 400 deg. F. on points up to 1000 feet distant.

Bulletin No. 2451-C describes in detail every size and type of Alnor distant reading thermometer; enumerates the services for which each type is best suited; gives installation and operation instructions; and lists prices for every instrument.

Booklet on Rubber and Asbestos for Petroleum Products, Printing, Etc. Printing of a new 16-page booklet describing rubber and asbestos products for the petroleum industry has been completed by Raybestos-Manhattan, Inc., Passaic, New Jersey, and is now ready for distribution. Principal R-M products for oil production, refining, transporting and maintenance are covered in this attractive, well illustrated booklet. It contains descriptions on new products and valuable information on rotary and other types of hose used on the drilling rig, oil loading hose for ship and tank cars, butane and airplane fueling hose, refinery, fire and still cleaning hose, belts for drilling and pumping, brake blocks for oil well draw-works, and packings and gaskets. Copies may be obtained by requesting Booklet No. 6903.

H-VW-M Bulletin 106, available from the Hanson-Van Winkle-Munning Co., Matawan, N. J., presents conveniently and briefly the characteristics of the Matawan Cleaners for effective metal cleaning.

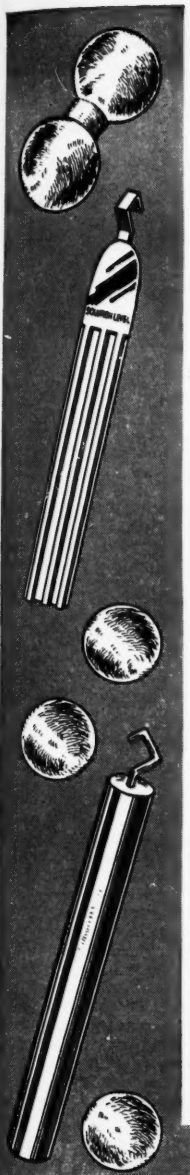
Bulletin PC-1. An illustrated bulletin describing the "Panelmount" Capacitrol series of indicating pyrometer controllers has been made available by the Wheelco Instruments Company, 847 W. Harrison Street, Chicago 7, Illinois.

The new bulletin explains such features as drawer type chassis, complete front accessibility and, of course, "The Wheelco Electronic Control Principle" which are inherent in all models including the Proportioning and Multronic (dual circuits) types.

Hammond Catalog No. 60. Hammond Machinery Builders, Inc., 1625 Douglas Ave., Kalamazoo, Michigan, has just announced release of an informative catalog covering polishing, buffing, grinding and deburring machinery. The new Catalog No. 60 describes new and improved polishing lathes, backstands for abrasive belts, to be used with polishing lathes, improved OD cylindrical finishing machines for tubes, bars and cylindrical stock; contour finishing machines for odd or irregular shapes and the new and complete line of 10 Junior Automatics for use in conjunction with polishing lathes or abrasive belt machines.

Send NOW for this FIT-ALL
DRUM PLUG WRENCH
Instantly loosens, tightens 95% all plugs or bungs in steel drums. Has 16" extra-strong steel tubing handle. Wgt. only 2 lbs. Order 1 or more today!

THOUSANDS IN USE saving time, labor, accidents!
SATISFACTION GUARANTEED... **$2.60**
Non-sparking type $4.00
Plus Parcel Post
MORSE MFG. CO., Inc.
124 Dickerson, Syracuse 2, N.Y.



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You can depend on Harshaw products to keep your production moving. For more than fifty years we have concentrated on improving the quality of the anodes and chemicals used by platers.

NICKEL PLATING . . . nickel anodes—all commercial grades and sizes . . . anode bags . . . nickel salts—single and double . . . nickel chloride . . . nickel carbonate . . . boric acid.

CHROMIUM PLATING . . . pure "Krome Flake" 99.8% CrO_3 . . . sulphates less than .10% . . . lead, tin-lead and antimony-lead anodes.

COPPER PLATING . . . copper ball anodes . . . Rochelle Salts . . . sodium and copper cyanides . . . copper sulfate . . . copper fluoborate.

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SILVER PLATING . . . silver cyanide . . . silver nitrate.

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CLEVELAND	DETROIT	PHILADELPHIA
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Bulletin No. 22 on Wood Tanks and Vats, containing complete data on performance and application, may be obtained from Wendnagel & Co. Inc., 600 W. Cermak Road, Chicago 16, Illinois.

Unichrome Clear Dip for Zinc Die Castings. Instructions outlining a simple dipping process for producing a clear, bluish coating directly on zinc die castings are available in Unichrome Dip Bulletin 12 published by United Chromium, Incorporated, 51 E. 42nd St., New York 17, New York.

Diversey No. 909 Heavy Duty Soak Tank Metal Cleaner. Literature describing this product, its uses and advantages is available from The Diversey Corp., 53 W. Jackson Blvd., Chicago 4, Illinois.

Bulletin CA496 describing the "Fireye Photoelectric Flame Failure Safeguard" is available from the Combustion Control Corporation, 77 Broadway, Cambridge 42, Massachusetts. Construction and operating features of the device are described in the bulletin.

"Welded Tapes for Spot Welded or Hot Riveted Seams" is the title of a folder available from Pittsburgh Plate Glass Company, Grant Building, Pittsburgh 19, Pennsylvania. The folder describes uses for Weldseal Tape in protecting spot welded and hot riveted assemblies from corrosion. Information on other compounds of a similar nature is contained in the folder.

Henry A. Gardner Laboratory, Inc., Bethesda 14, Md., recently released two pamphlets illustrating and describing in full detail the **Original Gardner Mobilometer** and the **New Can Mobilometer** for measuring mobility and consistency of materials in their original containers. Both units determine the body or mobility of such industrial products as paints, vitreous enamel slips, lubricant greases, emulsions, dispersions, oils, and other viscous or semi-plastic materials.

Zuhr Testing Equipment. Literature illustrating and describing testing equipment for organic coatings is available from Henry Zuhr, Inc., 187 Lafayette St., New York 13, New York.

Brush Catalog. A new 64-page catalog illustrating and describing its complete line of industrial brushes of all types is available from Solo-Morton Brush Company, Inc., Department WM-77, 940 Eighth Avenue, New York 19, N. Y.

"Karbate" Pipe and Fittings Manual. National Carbon Co., Inc., has announced the publication of an Installation Manual for use in connection with its present "Karbate" Brand Pipe and Fittings Booklet, Catalog Section M-8800B. The manual gives detailed information on the installation of "Karbate" pipe, fittings and connections and also on the cements that are used to bond these products. It shows the prospective user how easy it is to fit and assemble "Karbate" pipe and fittings.

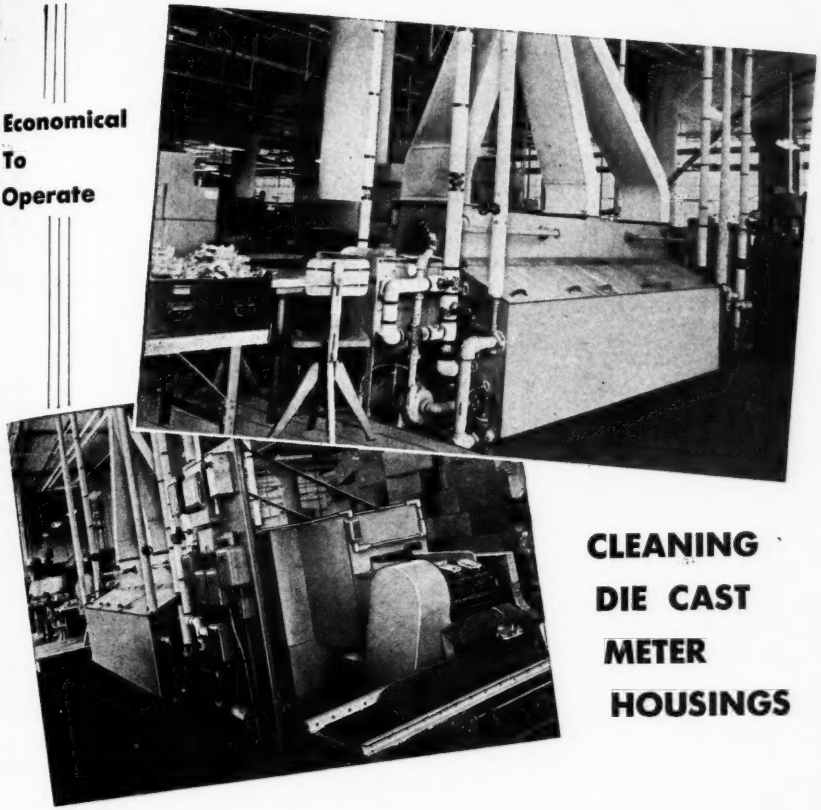
A copy of Catalog Section M-8801, the installation manual and its companion booklet, Catalog Section M-8800B, may be obtained by writing National Carbon Co., Inc., 30 East 42nd Street, New York 17, N. Y.

A new, illustrated 12-page booklet, **"Fabricating and Finishing of Armco Zincgrip-Paintgrip,"** describes recommended methods for forming, joining, and painting this special zinc-coated and phosphatized sheet steel.

Helpful suggestions for shop men are given in sections on storage, forming, and drawing; welding and soldering; and cleaning and painting. To prevent surface damage and to maintain the paint-holding qualities of the special phosphatized zinc-coating, precautions and recommendations for welding and cleaning are discussed in detail. A description of the material and of paint-holding tests conducted by the National Bureau of Standards and Bell Telephone Company laboratories are also included.

A copy of the booklet may be obtained by writing to The Armco Steel Corporation, Middletown, Ohio.

Economical To Operate



CLEANING DIE CAST METER HOUSINGS

METALWASH Belt Conveyor Type Machine

Pictured above is a newly designed METALWASH machine installed in the plant of a prominent manufacturer of electric meter housings. These intricate die cast pieces are thoroughly and quickly washed, rinsed and dried in this Conveyor-Type Unit—ready for succeeding operations.

METALWASH Machines are equipped with special high pressure nozzles and powerful standard pumps designed to handle the most difficult cleaning jobs in minimum time.

We cordially invite inquiries from manufacturers who have cleaning and drying problems. Our engineering service can be of value to you.

METALWASH MACHINERY CORP.
149 - 155 SHAW AVENUE IRVINGTON 11, NEW JERSEY

Alpo-33A Hammer Finish is the subject of a technical data sheet published by the Standard Varnish Works, 2600 Richmond Terrace, Staten Island 3, New York.

"Know Your Brushes," a four-page bulletin published by the Solo-Horton Brush Co., Inc., 940 Eighth Ave., New York 19, N. Y., discusses current and future conditions in the brush industry.

H-VW-M Copper Oxide Rectifiers for use in electroplating, electrotyping, and anodizing are thoroughly explained and illustrated in **Bulletin ER 103-1** issued by the Hanson-Van Winkle-Munning Co., Matawan, New Jersey.

Brookfield Synchro-Lectric Viscometer is the subject of an illustrated catalog available from Brookfield Engineering Laboratories, Inc., 002 Porter St., Stoughton, Mass. Features, construction details, and advantages of the viscometer are discussed, and detailed descriptions of various models of the device are furnished.

CORRECTION

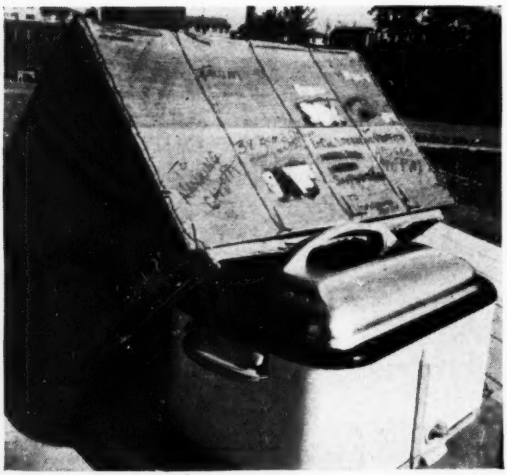
Catalog 48, Herold Rotary Power-Driven and Other Brushes, can be secured from The Herold Manufacturing Co., 3927 Clark Ave., Cleveland 9, Ohio.

The company name was incorrectly listed as Holland on page 113 of the August issue.

A LITTLE BOX GOES A LONG WAY. An American-made vitreous enameled roaster is on the job in Tokyo after crossing the Pacific Ocean three times and finally reaching its destination in perfect operating condition and without a mar to its gleaming finish.

The roaster was shipped last October by Warren E. Griffith of San Francisco, Executive Director of the California Society for Crippled Children, to his son and daughter-in-law, Lt. Col. and Mrs. Stebbins Griffith, who then were stationed in Nanking, China.

A wooden box was constructed to hold the roaster, but the total weight of the package exceeded parcel post limits. The problem was solved when a specially designed wirebound box was made by hand with rotary cut lumber, five binding wires, and all-bound ends. The roaster was in a corrugated container, which was "over packed" in the wire-bound.



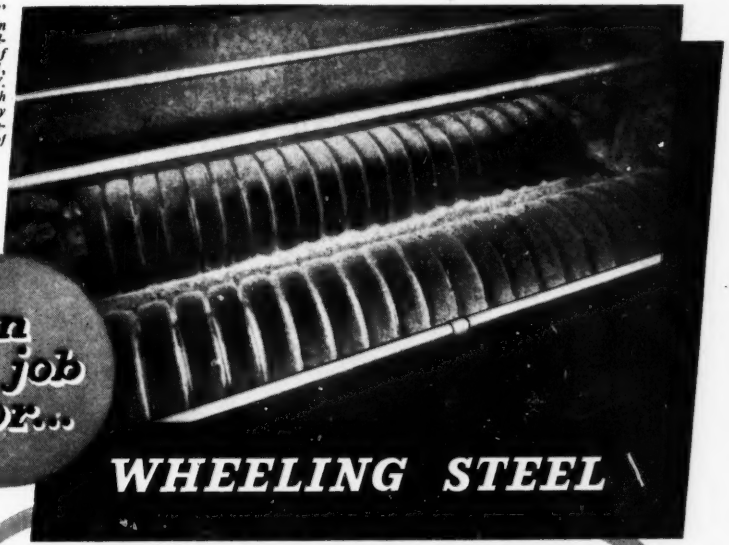
The package originally was shipped to Col. Griffith in Nanking, but was sent back to San Francisco because he meanwhile had received evacuation orders. By the time the roaster reached San Francisco, Col. Griffith had been transferred to Tokyo—so once more the roaster, still in its original handmade wirebound shipping box, was reshipped.

This time, the Griffiths and the roaster made connections. They reported that it reached them in perfect condition and that the box, too, was still sound and sturdy.

(Photo courtesy Wirebound Box Manufacturers Association)

"PITTSBURGH" *Power Driven* BRUSHES

A "Pittsburgh" power-driven brush in operation at the Steelcrete Division of Wheeling Steel, Beach Bottom, W. Va. This special brush is on the job every day deburring and cleaning large sheets of Expanded Metal.



On the job for... WHEELING STEEL

Pittsburgh's ingenuity in designing special brushes for unusual jobs is sought time and time again by leading firms in almost every industry. Wheeling Steel, for example, recently put its brushing problem before Pittsburgh's staff of skilled brush engineers.

Selecting a .014 steel wire with pre-tested fast cutting qualities, Pittsburgh engineers designed and built a *Perfect Balance* rotary brush that could take a beating and come right back for more. The brush was *stiff* enough to remove stubborn burrs. It was *tough* enough to penetrate and thoroughly clean the metal. And it was *soft* enough not to impair surface texture.

The brush did the job right from the first day it was put into operation—another example of Pittsburgh's ability to cope with the most difficult brush problems.

There's a "Pittsburgh" Brush for Every Industrial Use!

- GLASS
- STEEL
- PLASTICS
- AUTOMOBILE
- RUBBER
- PAPER
- TIRE and RETREADING
- SHOE MANUFACTURING and REPAIRING

In the complete Pittsburgh line are brushes of all types, including "Perfect Balance" sections, wheels and assemblies. Consult the Pittsburgh engineering representative. He will gladly work with you in developing any type of power-driven brushes to meet your particular finishing specifications.

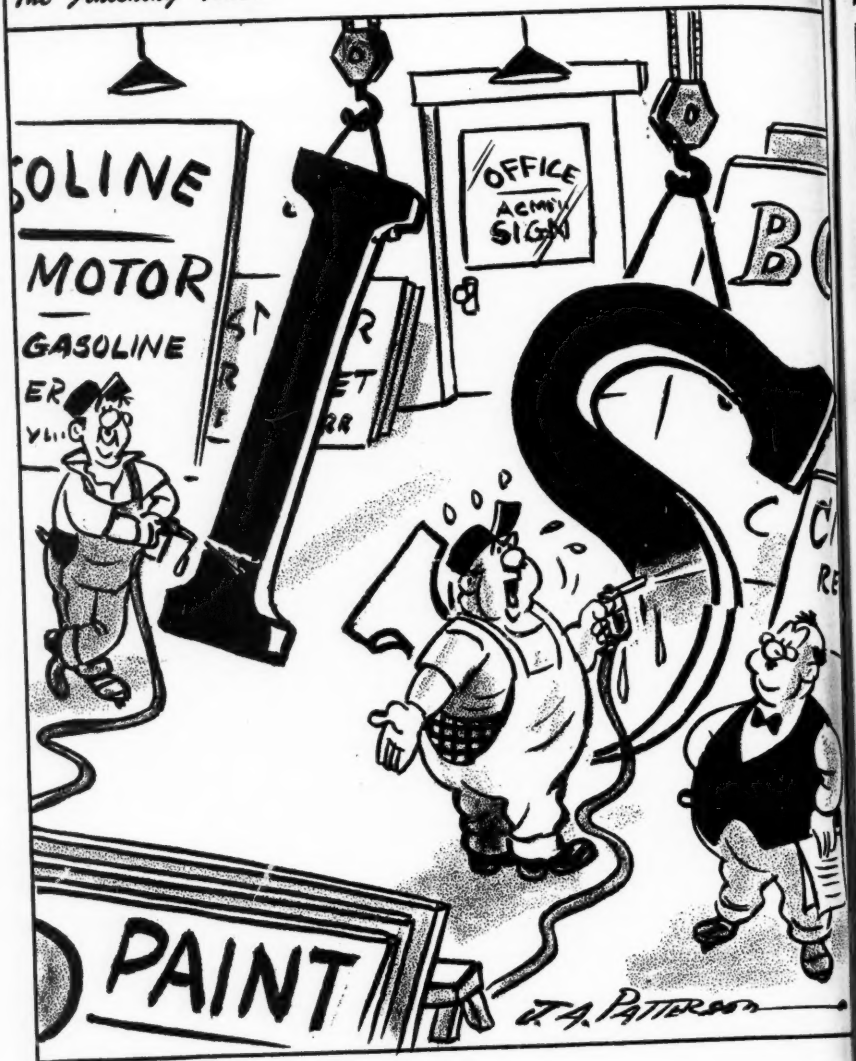
Phone or write Pittsburgh Plate Glass Company, Brush Division, 3221 Frederick Ave., Baltimore—29, Maryland

Power Driven BRUSHES

PPG BRUSHES · PAINT · GLASS · CHEMICALS · PLASTICS

PITTSBURGH PLATE GLASS COMPANY

The Finishing Touch — **By J. A. Patterson**



"No, I ain't slower—my 'S' is bigger than his 'I'!!!"

Opportunity Section

LIQUIDATION SALE

$50,000 stock of paints must be moved at once! Includes gloss and flat enamels, wrinkles, primers, hammers and lacquers in all colors from well-known manufacturers. Take advantage of these rock bottom prices:

Partial and full drum lots: $1.25/gal.
Five gallon can lots: 1.50/gal.

Defoe Finishing Co., 1750 N. Kimball, Chicago

FOR SALE

Fostoria Infra-Red Tunnels, 5 sections, 35 ft. long, with Webb Mono-Rail Conveyor, 150 ft. long, like new. • Gehnrich Recirculating Gas Oven 6' x 8' x 6' 6", all controls, good operating condition. • Stromes Recirculating Oven 10' x 10' x 7', all controls, like new.

LINCOLN METAL PRODUCTS CORP.
136 Clifton Pl., Brooklyn, N. Y., MA 2-2516

FOR SALE: 1 Divine 6 unit type, straight line automatic polishing and buffing machine, including 6-7½ HP units, with conveyor, drive, belt, and all motors, starters and applicators, 220V, 3 phase, 60 cycle, USED. Write Box No. 92, c/o PRODUCTS FINISHING, 431 Main Street, Cincinnati 2, Ohio.

Sales Agency now engaged in selling polishing and grinding machinery and equipment to plating and metal finishing industry in the Chicago area interested in handling line of buffs. Write Box No. 91, c/o Products Finishing, 431 Main Street, Cincinnati 2, Ohio.

FOR SALE: 2 Heavy Duty Acme Semi-Automatic Buffers and 25 HP Heavy Duty Ball Bearing Buffing Lathe, 220-440 volt 60 cycle 3 phase. Excellent equipment for finishing kitchen utensils, bowls, cocktail shakers and other large cylindrical shapes. Equipment used but 6 months, in excellent condition. W. J. Holtmeier, Inc., 71 West 23rd Street, New York, New York.

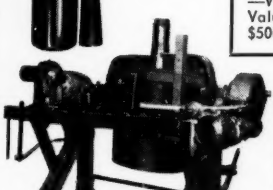
PAINT STRIPPING
WE REMOVE
Baked, Air-dried, Plastic and all other finishes from all base metals.
For quick, efficient and low cost service write or call
Alchem Metal Process Corp.
614 W. 58th St., N. Y. 19 Circle 7-0238

WAR SURPLUS BARGAINS—
New and Used Equipment—

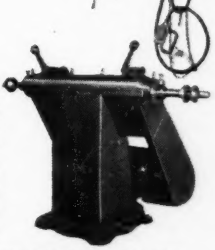
Acme "Ten Pounder"
New 10 lb. Cap. CO_2 extinguishers. No mess—no damage from CO_2. Underwriter approved. Latest type. Regular List $48.00. Our Price **$39.50.** F.O.B. Chicago.

500 Hoists—Electric (AC and DC) Pneumatic Air and Chain
Large stock of nationally known used hoists with capacities from 250 lbs. to 5 tons. All in excellent condition. Savings up to 60%. Get our low prices today!

"Roto-Spray" Washing Machines
Used—in excellent condition. 22 on hand —Varsol type—easily conv. to aqueous sol. Values up to $2500.00. Our Price from $500.00 ea. Savings up to 75% on these!

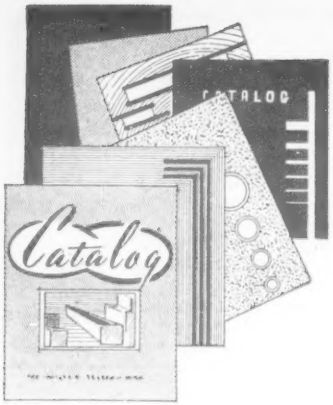


Schutte & Koerting Tilting Rotating Tumbling Barrel.
23½" ID x 28" OD Barrel. Complete. 3 on hand. Used — excellent. Est. New Price $2500.00. Our Price **$750.00** ea. F.O.B. Marion, Ill.



GARDNER Polishing Lathes.
No. 3D. Double Spindle units. 3000 RPM; Totally enclosed 5 HP. 3/60/220-440 motor. Used — excellent. 28 on hand. Est. New Price $900.00. Our Price **$360.00** ea. F.O.B. Marion, Ill.

ACME EQUIPMENT CO., INC., **126 S. CLINTON STREET — RM. 244 CHICAGO 6, ILLINOIS**



Catalogs

FOR YOUR LIBRARY

To obtain copies of the catalogs listed here, indicate on the coupon the number of the item in which you are interested and mail as directed.

1. Finishing Equipment

"Mahon Industrial Equipment," including Complete Finishing Systems for Enamel; Lacquer; Paint and Varnish; Spray Pickling Equipment; Metal Cleaning and Rust Proofing Equipment; Dry-off Ovens; Filtered Air Supply Systems; Hydro-Filter Spray Booths; Drying and Baking Ovens; Core Ovens; Dust Collecting Systems, is described in a booklet available from R. C. Mahon Company, Detroit 11, Michigan.

2. Solvent Degreasing

A 16-page booklet which emphasizes fundamental practices for the economical use of degreasing solvents in metal cleaning departments of industrial plants has been published by the Detrex Corp., Detroit 32, Michigan.

3. Synthetic Resins

A 20-page technical booklet which includes a description of the properties and uses of all Hercules synthetic resins is now available from the Hercules Powder Co., Inc., Wilmington, Delaware.

4. Industrial Lacquers

A color card containing samples of the variety of colors of Pittsburgh industrial lacquers for wood and metal, together with suggestions for application of the lacquers, has been issued by the Pittsburgh Plate Glass Co., Industrial Paint Division, Pittsburgh, Pennsylvania.

5. Electroplating Tape

Physical and chemical properties of "Scotch" electroplating tape, general functions in electroplating, insulation protection, and application procedure for plating racks are contained in a data sheet published by the Minnesota Mining & Manufacturing Co., St. Paul 6, Minn.

6. Lead-Tin Plating

General Chemical Fluorine Div., New York 6, N. Y., is distributing Technical Information Manual LTF-1 which contains extensive data on the plating of lead-tin alloys.

7. Plating Chemicals

Bulletin AC-105, published by the Hanson-Van Winkle-Munning Co., Matawan, N. J., describes the company's complete line of anodes and plating chemicals.

8. Industrial Washing Machines

Factors to be considered in making a proper choice of equipment for thoroughly cleaning metal products are described in a 28-page book published by The Alvey-Ferguson Co., Cincinnati 9, Ohio.

9. Process Equipment

An eight-page general catalog issued by The Duriron Co., Inc., Dayton 1, Ohio, provides a brief description of a complete line of corrosion resisting equipment, including pumps, pipes, valves, etc.

10. Brass Cleaners.

Oakite Compositions Nos. 91 and 91-A for use in electrocleaning brass and other copper alloys before electroplating are the subject of a four-page service report available from Oakite Products, Inc., New York 6, New York.

11. Buffs

A folder describing in detail the advantages of Jackson Airway Ventilated Buffs is available from the Jackson Buff Corp., Long Island City 1, New York.

12. Corrosion Resistant Equipment

Haveg Corp., Newark 67, Del., has published Bulletin F-5 which illustrates by industrial application photographs and describes Haveg corrosion resistant equipment and its properties.

13. Black Finish

"Pentrate," a process for applying a protective, penetrating black finish to steel, is fully explained in a 20-page catalog issued by the Heatbath Corp., Springfield, Massachusetts.

14. Bright Nickel Plating

Udylite Bright Nickel Plating Process and its advantages are the subject of Bulletin 51, distributed by The Udylite Corp., Detroit 11, Michigan.

15. Synthetic Finish

"Dimenso," a synthetic finish that is designed to provide two colors in one spray operation, is described in a booklet now available from The Sherwin-Williams Co., Cleveland 1, Ohio.

16. Alodizing

A rapid, effective, and economical process for protecting aluminum and anchoring paint is described in a four-page illustrated technical service data sheet released by the American Chemical Paint Co., Ambler, Pennsylvania.

17. Parts Washers

Bulletin No. 91, published by the Optimus Equipment Co., Matawan, N. J., describes the Optimus line of washers and degreasers.

18. Infra-Red Ovens and Conveyors

A 20-page catalog published by Jensen Specialties, Inc., Detroit 27, Mich., illustrates and explains the advantages of coordinating infra-red ovens with conveyors in performing baking, drying, preheating and dehydrating operations.

19. Dust Eliminators

A 12-page folder prepared by Schmieg Industries, Inc., Detroit 2, Mich., presents illustrated, descriptive, and blueprint data on a complete line of swirl type dust and fume eliminators.

20. Parkerizing

A catalog describing applications and advantages of Parkerizing has been issued by the Parker Rust Proof Co., Detroit 11, Mich. Coatings obtainable by Parkerizing various products such as forgings, castings, stampings, and so on, are discussed.

21. Refinishers' Price List

The Rinshed-Mason Co., Detroit 10, Mich., has available Refinishers' Price List No. 107 which lists and describes each item of its line of automotive undercoats and finishing materials.

22. Industrial Ovens

The Kirk & Blum Manufacturing Co., Cincinnati 25, Ohio, has published a descriptive catalog showing installation views of its wide variety of industrial ovens in various types of plants.

23. Silicone-Base Finish

Properties of Mico silicone-base aluminum finish and product applications for the finish are outlined in a folder issued by Midland Industrial Finishes Co., Waukegan, Illinois.

24. Nickel Activator Bulletin

A bulletin describing "Chrometex," a nickel activator used to increase the covering power of chrome, and its application is available from MacDermid Inc., Waterbury 88, Connecticut.

25. Clear Lacquer

The Randolph Products Co., Carlstadt, N. J., has issued a folder which contains helpful, technical, and factual information on clear lacquer.

26. Air Compressor

The DeVilbiss Co., Toledo 1, Ohio, has issued a four-page folder describing and illustrating its NCD Air Compressor for the home workman, small service shop, or as an auxiliary unit for the painting contractor.

27. General Purpose Cleaner

A four page folder published by the Pennsylvania Salt Manufacturing Co., Philadelphia 7, Pa., describes Pennsalt MC-1, a cleaner for general maintenance use, steam gun cleaning, and tumble barrel cleaning.

28. Chromium Plating

A bulletin describing the advantages of "Mechrome," a bulk chromium plating process, and "Nuchrome," a new chromium plating solution formula, has been published by Chromium Engineers, Inc., Chicago 16, Illinois.

29. Degreasing Solvent

A leaflet outlining the details of an improved Blacosolv Degreasing Solvent which incorporates new and improved stabilizers can be obtained from G. S. Blakeslee & Co., Chicago 50, Illinois.

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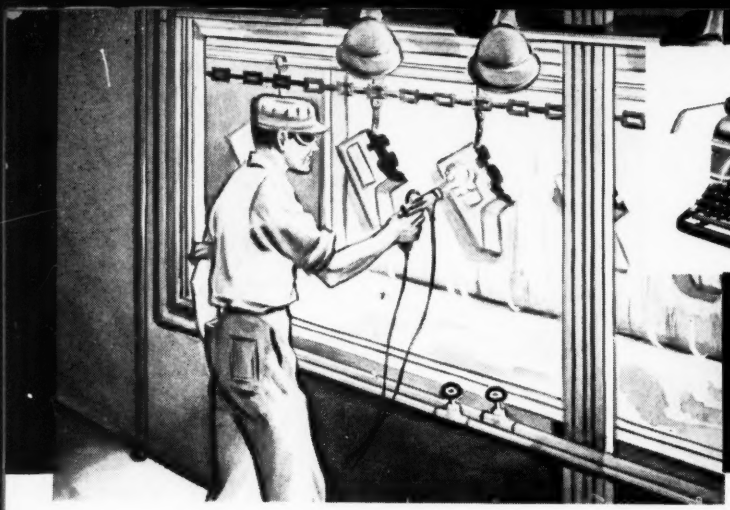
SEPTEMBER 1949



Rejects and Refinishings *Cut Almost* 30%

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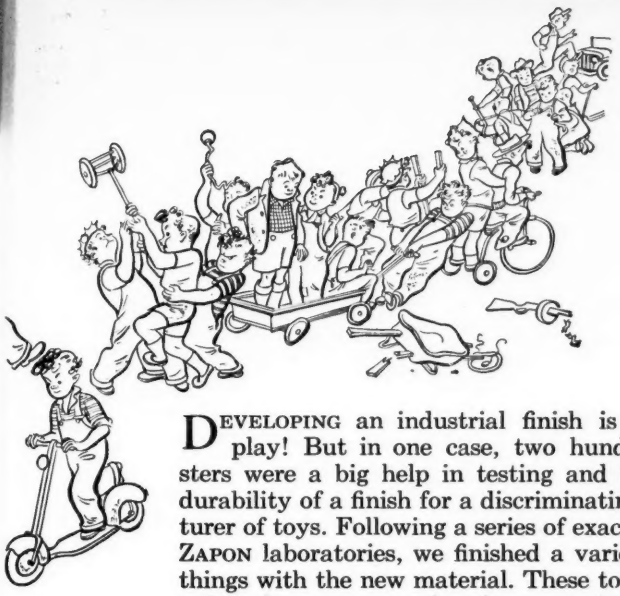

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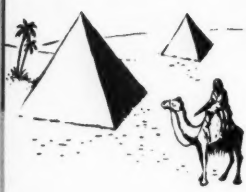

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